Nursing Practice Guideline for Foot Care for Patients with Diabetes in Thailand

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A Thesis submitted in partial fulfilment of the requirements of the award of the Doctor of Philosophy in Nursing

Through
The School of Nursing and Midwifery
De Montfort University
U.K.

December 2014

Declaration

The thesis is the result of my own work without any collaboration and was carried out during the registration period for the award. No part of this thesis has been submitted for any other academic qualifications.

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Dedication

This thesis is dedicated to my father and my mother who wished to see me complete my doctoral degree and continually inspired me.

I also dedicate this work to my sister and brother, for their support through the good time and tools for my study.

I would also like dedicate this work to my lively husband (Art) and my lovely son, without them there is no meaning for my life. He is always the best who encouraged me to continue with my doctoral degree.

Furthermore, I dedicate this work to all diabetic patients who suffer neuropathy and complications of diabetes.

Acknowledgements

For the creation of this thesis, “Nursing Practice Guideline for Foot Care for Diabetic Patients in Thailand,” I would like to take this opportunity to express my sincere thanks and appreciation to the following people for their assistance and cooperation which was highly worthwhile and valuable.

My deepest thanks goes to Dr Sam Parboteeah my first supervisor for his support, assistance and his encouragement who stood behind me for the completion of this work and made it possible. His wide knowledge, understanding and personal guidance provided a good basis for the present work.

My deepest appreciation goes to Dr Linda Rafter, my second supervisor, who gave her assistance and support.

My deepest appreciation also goes to Professor Denis Anthony who gave an opportunity to complete this thesis for PhD course at De Montfort University; he was my later first supervisor and kindly supported the amendment period of this thesis.

My deepest appreciation goes to Dr Peter Norrie who gave his assistance and support during the amendment of this thesis.

My deepest thanks go to Dr Gill Perkins for her guidance in the presentation of this thesis in some chapters and to Dr David Boorer for his guidance in language.

My deepest thanks go to the director of Prapokkloa Hospital, the director of Makram Hospital, my colleagues in Prapokkloa Hospital and Prapokkloa Nursing College for supporting me with the research and data collection, and Dr Tongsouy Sritanon and Dr Pornridee Nitirat who guided the language translation.

My special thanks go to all the experts from the Delphi technique who gave their valuable time for their comments and encouragement, especially Dr Pratum Soiwong, Professor Dr Siriporn Janchai and Thiti Prab Na Sak.

To my dearest friends who continually supported me to greatness both in Thailand, the UK, and US :Walaipan Chonsok, Dr Chetta Kaewprom, Dr Tanyapat Jeavetchasin, Dr Nuttawan Khumsan, Koy Rassadawan, Porntipa, Van Napak, Gati Aucharee, Nok Tantawan and all my friends in Prapokklao Nursing College and in Thailand.

Abstract

Although medical practice guidelines for diabetic foot care exist globally, there is no clear guideline for nurses to direct clinical foot care practices for diabetic patients in Thailand. The purposes of this qualitative study were to explore the current practice of diabetic foot care and to develop a nursing practice guideline for effective foot care.

The research design included two phases, consisting of situation exploration and practice guideline development. For the first phase, semi structured interviews were conducted among fifteen diabetic patients, five nurses, and five nurse educators at Prapokklao hospital, Thailand to discover their knowledge and practice in foot care. A content analysis approach was used in data analysis. The findings revealed that, although foot care education was available, diabetic patients lacked knowledge and had poor foot self-care practice. Nurses and educators also had inadequate knowledge about effective diabetic foot care and they had scarcely ever provided advanced practice for foot care. Moreover, patients had not been categorised regarding their foot risk level, nor had they received appropriate levels of foot care to manage their particular situations.

For the second phase, a nursing practice guideline was developed. The classical Delphi technique was applied to examine experts' agreement on the practice guideline contents. A questionnaire was developed, based on the first phase's information and critical literature review using Soukup's model. Twenty diabetic foot care experts from around Thailand completed the questionnaire. The acceptance of experts' agreement was 94-100% in all aspects. A final guideline was developed which consisted of the initial risk assessment of foot ulceration and specific guidance on the interventions. This guideline, based upon local specialist expert opinion, provides a clear resource for referral and standardised procedures for evaluating footwear and screening to detect the risk of foot complications.

In conclusion, this current nursing practice guideline for diabetic foot care was the first guideline for Thai nurses to care for diabetic patients in a Thai cultural context, and is based on local specialist experts' opinion. This foundation work provides the basis for further research and evaluation concerning the prevention of foot complications and foot management for diabetic patients, including evaluating the effectiveness of the current risk assessment form and risk classification procedures.

Abbreviations

DFC	Diabetic foot care
DFU	Diabetic foot ulcer
DM	Diabetic Mellitus
MDT	Multidisciplinary team
IDF	International Diabetes Federation
IWGDF	International Working Group on the Diabetic Foot
IFG	Impaired Fasting Plasma Glucose
SJT	Social Judgment Theory
UKPDS	UK Prospective Diabetes Study Group
DAFNE	The Dose Adjustment for normal fasting education programme
DESMOND	Diabetes Education and Self-Management and Newly Diagnosed
NICE	National Institute of Clinical Excellence
PVD	Peripheral Arterial Disease
PVD	Peripheral Vascular Disease
ABPI	Ankle Brachial Pressure Index
APN	Advance Practitioner Nurse
UT	University of Texas

Glossary

Diabetes	Disorder of blood glucose level due to abnormality of pancreas
Type 2 diabetes	The characteristic of elevated blood sugar caused by defective insulin action or secretion
10 G Semmes -Weinstein Monofilament	Instrument used for testing of sensation to assess neuropathy in feet
Neuropathy	Complication occurring from changing pathology of the peripheral nervous system and denoting functional disturbance
Claudication	The state caused by inadequate blood supply to muscles. The symptom includes cramping pain in the calves and leg that is relieved by rest
Glycaemia	The normal state of blood glucose level is <7.0 mmol/dl or <110 mg/dL
Impaired fasting plasma glucose (IFG)	The state of blood sugar level in people who have fasted for 6 hours. Blood levels are 6.1-7 mmol/l for fasting plasma glucose
HbA_{1C}	The form of glycated haemoglobin used to measure blood glucose control over the previous 8-12 weeks
DAFNE	**The Dose Adjustment for Normal Fasting Education Programme** An education programme for diabetics using insulin. The client learns how to adjust the daily dose of insulin based on his/her daily requirement and activities
Nurse	A person who has completed the four year nursing education programme in Thailand
Advanced Practitioner Nurse	A nurse who has undertaken advanced level training and study which have been accredited by the Nursing and Midwifery Council of Thailand
Educator	Nurse in Thailand who works as a lecturer, instructor and mentor with students in classroom teaching and clinical practice in hospital

Doctor	A person who graduated as a general doctor and can treat all patients but has no specialist field
Multidisciplinary team	A group of health care workers who work collaboratively for treatment and referral of patients
Rehabilitation Doctor	A professional doctor who is an expert in treatment for restoration of normal health and function of an injured, ill or disabled patients
Physiotherapist	A person who employs physical methods to promote healing of disability using light, electric current and remedial exercise. In diabetic foot care, person applies methods of off-loading using foam moulded shoes

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Chapter One: Introduction to Diabetes and Health Care System in Thailand

This chapter provides an overview of the prevalence and incidence of diabetes in the world and the epidemic of diabetic foot ulcers. It also discusses the types of diabetes with greater emphasis on the complications associated with type 2 diabetes and the health care system in Thailand. It further explores the services for diabetic patients in Thailand, including current foot care services and the management of the diabetic foot and associated complications. Following discussion of the above issues, this chapter concludes with the research questions and aims of the study.

1. Background of the study

1.1 DFU incidence and prevalence in Thailand

Diabetic patients develop macrovascular and microvascular changes resulting in neuropathy. This complication predisposes the patient to the formation of foot ulcers. A research study by Ramsey et al. (1999) has shown that, in patients who have controlled glycaemia, neuropathy takes about 10 years longer to develop compared to those with poorly controlled blood glucose where complications can arise 5 years sooner. The mean incidence rate of diabetic foot ulcer per year was 2.0 percent (Ramsey et al. 1999). Patients who developed foot ulcers that were healed had a recurrence at 18 months (Winkley et al. 2007). Ramsey (1999) reported that 15 percent of patients with foot ulcers developed osteomyelitis and subsequently had an amputation. Neuropathy increases morbidity (Ramsey et al. 1999, Winkley et al. 2007), mortality (Ramsey et al. 1999) and excess care costs (Ramsey et al. 1999, Apelqvist et al. 1993).

The number of diabetic foot ulcers in Thailand was 13.4 percent in patients who had diabetes for a long period (more than 10 years) and 5.3 percent in diabetes for a short period (less than 10 years) while the prevalence of amputation was 5.5 percent in long-term diabetes and 2.0 percent in short-term diabetes (Leelawattana et al. 2006). The risk

factors associated with lower extremity amputation in diabetic patients in Thailand included a history of foot ulcers, the absence of peripheral pulses (Tunsawat et al. 2004), diabetic retinopathy and insulin injection (Krittiyawong et al. 2006), foot deformity in Thai people, especially callus formation (Tantisiriwat and Janchai 2008), and neuropathy (Rerkasam et al. 2007). In Thailand, the incidence and prevalence of diabetic foot ulcers and amputations are higher compared to developed countries such as the UK but similar to developing countries such as India as shown in Table 1.1.

Table 1 1 Epidemiology of diabetic and diabetic foot complication

Country	Prevalence DM Rate (%)				Most common age group	Prevalence of diabetic foot problem	Diabetic foot problem			
							Prevalence		Incidence	
	2004	2005	2006	2007		Year	Ulcer	Amputation	Ulcer	Amputation
US[1,3]	-	8	-	7.8	20-79	1999[4]	-	-	1.9	0.3
Canada [2]	-	8.8	-	-	>50 years	-	-	-	-	-
UK[1]	-	-	-	5.17	45-64	2002 [4]	1.7	1.3	2.2	-
India [1,3]	-	12	-	6.2	>65 years	1998[4]	3.6	-	-	-
China [3]	-	5.6	-	4.3	>65 years	1994[4]	3	-	-	-
Thailand[1,3]	6.7	10	-	-	34-54 years	2003[5,6]	3.3	1.5	3	3

Source: 1. William and Pickup (2004), 2. Lipscombe and Hux (2007), 3. Yoon et al. (2006), 4. Boulton (2006), 5. Kritiyawong et al. (2006), 6. Rerkasem et al. (2004)

2. Health Care System and Services Available in Thailand

The health care system in Thailand is designated at three levels: primary, secondary and tertiary care and is funded from the public sector by the Ministry of Public Health (65.8 percent), other ministries (6.1 percent, namely universities), state enterprises (0.8 percent), local administrative agencies (0.6 percent) and the profit and non-profit private sector (27.5 percent) (WHO 2000). Tertiary and secondary centres are specialised, providing cures, prevention and rehabilitation in an integrated manner. Both levels of care are provided within hospitals in both the public and private sectors. Most hospitals providing tertiary care are clustered in Bangkok (the capital city), and the central regions. Hospitals of secondary care are located in the communities. There are approximately 150 to 1000 beds in regional or general hospitals, 10-120 beds in community district hospitals and health care centres in communities of several villages. Primary care in Thailand is defined as the basic health care that is provided to all people. The role of primary care is to provide health promotion, disease and illness prevention, treatment of local common health problems, rehabilitation and palliative care (Hanucharurnkul 2007). In addition, primary care focuses on self-care and self-reliance and incorporates local wisdom or complementary therapy (Boontoung et al. 2000). Referral from primary care to tertiary care is essential in order to provide specialised treatment for more complex cases. In rural areas, people access primary care first via the health care centre which is managed by professional nurses, who may refer patients to the community district hospital or the regional hospital, respectively.

Diabetes care is provided at all three levels in the health care system of Thailand (Ministry of Public Health 2001). In primary health care there are two categories of services; a nurse-managed service in which nurses manage diabetic patients, including diabetes screening, follow up, giving health education and advice on their treatment, and a doctor-led service providing investigation, education and treatment Diabetic patients with more complications or risks are referred to secondary care. Moreover, diabetic patients receive foot examinations from a physiotherapist, and some hospitals have physiotherapists who are specialists in foot care and ‘off-loading’.

Secondary care is separated into three levels: preliminary, middle and upper levels. Patients in preliminary care are examined by the general doctor who undertakes further investigations, education and treatment. Patients receive education, screening for neuropathy and foot care advice from the doctor. In the middle and upper secondary levels, patients are examined and screened by neuropathy specialist doctors. Foot care education is provided by nurses and physiotherapists. If the patients have several complications, they are referred to upper secondary care or tertiary care, respectively.

Tertiary care is separated into two levels: preliminary and excellent tertiary care. Patients are examined by the specialist or diabetes doctors (both medical and surgical) and receive patient education from the MDT that includes a dietician, physiotherapist and professional nurse. Patients with severe complications are referred to excellent tertiary care, such as a medical hospital where patients are investigated for diabetic complications, namely retinopathy, nephropathy and neuropathy.

In Thailand, the Ministry of Public Health started a nationwide screening programme in 2004 called the 'Healthy Thailand Project', in order to identify undiagnosed diabetes. The national diabetes screening programme screens all persons over the age of 35 years or who are at risk of diabetes. Earlier diagnosis is believed to prevent or delay such complications and improve health outcomes. National early diagnosis consists of verbal screening and blood screening by testing capillary blood. If fasting blood sugar is less than 6 mmol/l (110 mg/dl), the individual will be followed up within the 2 next years. If fasting blood sugar is more than 6 mmol/l (110 mg/dl) and less 7 mmol/l (126 mg/dl), the person is at risk of diabetes and is referred for investigation. If blood sugar is higher than 7 mmol/l (126 mg/dl), the person is diagnosed with diabetes and referred for further investigation and management.

The lack of foot care knowledge in Thailand is an important problem. Many patients with type 2 diabetes are cared for by their general doctor or medical doctor. There are few podiatrists in Thailand. However, the Ministry of Public Health has been promoting a project on foot care screening throughout the country since 2005. Multidisciplinary diabetic foot clinics have been established in many areas and these consist of a medical doctor, nurse, physiotherapist and nutritionist. Most of these teams do not have an

orthopaedic doctor, specialist diabetes nurse or physiotherapist who can take care of the foot, such as measuring for foot pressure and giving advice on off-loading. Moreover, all hospitals can deal with foot problems, but there is no structured education programmes suitable for people in that area, and foot care knowledge is insufficient.

The lack of a common approach to managing the diabetic foot has resulted in an increase in the number of diabetic foot ulcers and foot amputations. A lack of foot care knowledge and poor foot care behaviour of patients, lack of foot ulcer assessments and foot care knowledge among nurses, unknown neuropathy assessments and unknown foot screening investigations by the health carers are important issues for the health care system of Thailand. Effective care can be implemented by the use of guidelines (Thomas et al. 1998). Diabetic foot guidelines are considered essential in reducing foot amputations and prevention of foot ulcers. The nurse's primary role is to screen for foot ulcers and to educate the patients in foot care (Boulton 2006), and these should be reviewed frequently in patients with any risk factors. In order to provide quality care, it is necessary to develop nursing practice guidelines for foot care, so this study aims to develop a strategy for implementing a national nursing practice guideline.

3. The Role of Multidisciplinary Teams on Diabetic Foot Ulcer Management in Thailand

In recognition of the growing problem of foot ulcers in diabetic patients and the ensuing complications, the Ministry of Public Health required foot clinics to be developed within primary, secondary and tertiary care. The clinics offer basic assessments for neuropathy and advice on basic foot care. Due to insufficient specialist staff in diabetes care in Thailand, such as doctors, specialist foot care physiotherapist and podiatrists, some diabetic foot clinic teams in primary and secondary care consist of non-specialised doctors, physiotherapists and nurses. Some diabetic foot clinic teams in tertiary care consist of medical doctors, surgeons, rehabilitation doctors or physiotherapists, and nurses.

The roles of the different professional groups in the MDT include medical doctors who assess glycaemia control and diabetic symptoms, the rehabilitation doctors or

physiotherapists who assess foot pressure and design suitable foot wear for off-loading pressure, surgeons who assess blood circulation or ischemia complications, and nurses who teach and advise how to take care of the foot, the wound dressing and nail cutting and callus.

4. Prevention of Diabetic Foot Ulcer: Guideline/Educational Activities

Diabetic foot ulcer prevention in Thailand is included in diabetic care programmes (Wattana et al. 2007). In the past, the content of foot care knowledge programmes was suggested by doctors and nurses. In 2005, a management plan was proposed which included an individualised therapeutic alliance between the patient and the family, the physician and other members of the health care team. Moreover, the management plan should be agreed on and understood by the patients and the care providers, with a practical goal and treatment plan. The plan should recognize glycaemia control and diabetes self-management education as critical components. Any plan should consider the patient's age, work timetable and situations, physical activity, eating pattern, social situation and personality, cultural factors and existence of complications or other medication (ADA 2008).

5. Foot care behaviour of patients in Thailand

Laptavee (2004) found that 82 percent of patients in rural areas of Thailand who developed a foot ulcer did not receive any education on foot care. Patient education in foot care is important in preventing complications and reducing health care costs. In Thailand, nurses in diabetes clinics have an important role to educate patients in self-assessment of their feet, to screen for neuropathy and to identify foot problems. Each diabetes clinic in each service has a foot screening programme with no national foot care guidelines. While some hospitals have developed foot care guidelines for doctors, nurses and nutritionists, there are no national foot care guidelines and only the clinical nursing practice guidelines for promoting wound healing in patients with diabetic foot ulcers are available (Suphimaros 2006).

This study proposed the following research questions.

6. Research Question

1. What is the current and best foot care practice in diabetic patients in Thailand?
2. What are the core components of foot care for the diabetic foot?
3. What are the processes that are unique to the foot care guidelines?
4. How can clinical guidelines improve patient outcome?

7. Aim of this Study

The study will aim to:

1. Explore current and best foot care practice in diabetic patients in Thailand
2. Identify the core component of foot care for diabetic patients in Thailand
3. Develop nursing practice guidelines for foot care in diabetic patients

8. Conclusion

Thailand has a very complex health care system and the health care services provided often depends on the ability to pay, the role of the state, voluntary organisations or the insurance system. Such a system can often limit access to good quality care and the need for prevention can often be overlooked. The chapter will conclude with justifications for the study.

9. Thesis Structure

This summary briefly outlines the content of each chapter in this thesis in an attempt to provide illumination of the process and rationale informing this study. This thesis is organised into eight chapters;

Chapter 1 presents an overview of this study and background to the issue of diabetes foot care in Thailand, identifies the research problem and highlights the importance of risk management in diabetes foot ulcer and set out the research's objectives.

Chapter 2 extensively reviews the relevant literature. It is organised into main two parts: the management of diabetic foot and the Delphi technique. The first part of the literature review therefore covers the problem of diabetic foot management from patients' and nurses' perspectives and diabetic foot practice guidelines. The second part describes the Delphi procedures and critically reviews the utilisation of the Delphi technique in health and nursing field.

Chapter 3 provides the theoretical underpinning of this study, which forms a base for developing the practice guidelines.

Chapter 4 describes the research methods: specifically data collection and data analysis. It includes two phases of data collection. Phase 1: interviews and phase 2: the Delphi technique. The justification for the chosen research strategy is explored.

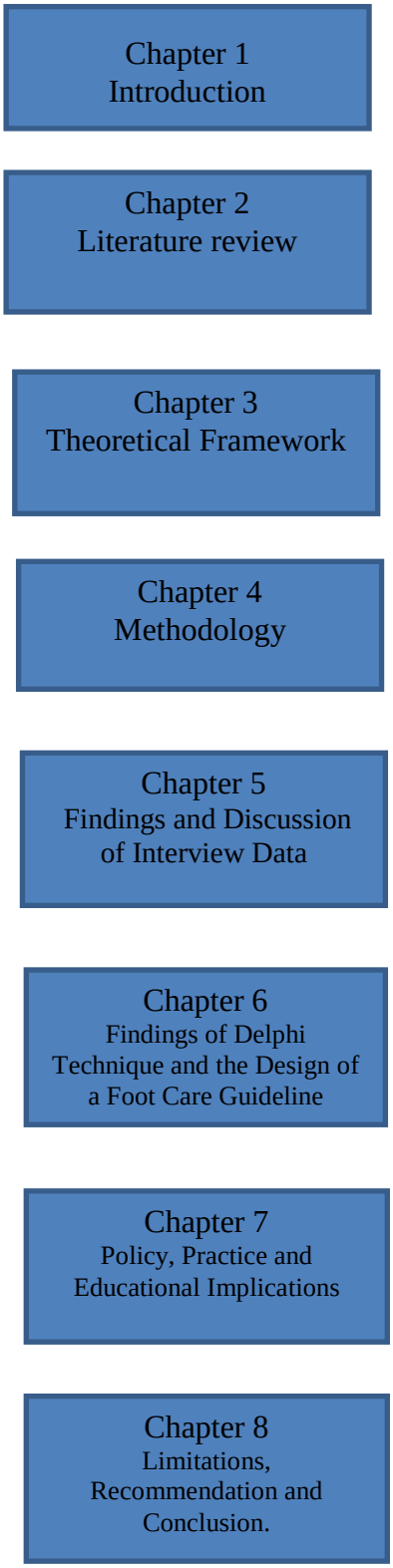
Chapter 5 presents the results of interviews which provide the main data and finding in light of the aims of the research and is separated into the three themes of nurses, educators and patients. There is further discussion of the findings in relation to the theoretical framework of this study.

Chapter 6 explains the process of each round in the Delphi technique. The results of the Delphi technique are presented in the form of the consensus agreement from each round. The discussion of the results is explained and the final foot care guidelines are developed and explained.

Chapter 7 examines the implications of the findings, which are considered in three sections: policy implications, nursing practice implications and nursing education implications.

Chapter 8 discusses the limitations of each method used, interviews and the Delphi technique. In addition, recommendations concerning the research finding are presented.

Figure 1.1 Overview of thesis structure



Chapter Two: Literature Review

1. Introduction

This chapter will critically review the current literature relating to the management of diabetic foot care. This review process is important to identify what research has already been done in the field of diabetes, including diabetic foot care management. By undertaking a critical literature review, the researcher aims to identify new perspectives on the topic as well as identify new knowledge. Since the focus of this research is primarily to develop a guideline for diabetic foot management in Thailand (as described in Chapter 1 Section 2 & 3) the review will also focus on the relationship between theory and practice. The review will also help to rationalise the problems, identify main methods used and place the research in a historical context. A critical review of research methodologies will help the researcher ensure that the proposed methodology for this study will serve to answer the research questions**.** Since this study employs a qualitative approach in the exploration and development of diabetic foot care guidelines, the literature review will emphasise those national and international studies that have applied qualitative methods to these problems, such as the use of semi structured interviews and the Delphi technique, to elicit knowledge of current practice and to inform the development of the care guidelines. It can also be argued that without establishing existing findings, it will not be possible to know how the new research finding from this study will advance our knowledge and clinical practice from previous studies.

The term 'literature review' refers to the processes involved in identifying and searching for information in a systematic way, on a particular research topic, in order to develop an in-depth understanding of the current knowledge on that topic, to critically analyse the available information, synthesise and evaluate the available knowledge, including identification of trends on the study topic (Burns and Grove 2005).

This chapter begins by explaining the search strategy employed in this research and the findings from the literature review. The focus of the literature review is firstly diabetic foot care in general, and then the problem of diabetic foot care in particular. The review concerns specifically foot care guidelines, and some supportive literature regarding differences with the existing national foot care guideline, the impact of guidelines in practice, including foot care management. This chapter also discusses the Delphi technique in developing a clinical practice guideline. In addition, the review literature focused on the research questions, which are explained in the next section.

2. Search strategy

2.1 Strategy overview

Searching literature is the first step of any literature review because it helps the reviewer access informative resources upon which to base that review. This step is a challenge because diabetic foot ulcer is not a new area of concern and the studies related to the issue are found on various databases, rather than in one specific location. Appropriate literature searching can maximise the number of eligible primary sources (Whittemore and Knafl 2005).

The literature review in this study draws upon the systemic review approach. A systematic review is generally used to gather the best possible existing research knowledge in order to develop understanding of the evidence relating to practice (Whittemore and Knafl 2005). The aim of systematic review is to identify the gaps in research knowledge (Hewitt-Taylor 2002), to combine, and to examine the results of previous research (Conn et al. 2003). Therefore, in this review the systematic approach was used in order to understand the previous knowledge concerning diabetic foot care management and clinical practice guidelines for foot care, as the basis of an on-going study of Thai nurse's and diabetic patient's experience of diabetic foot care. A systematic review helps to explain what kind of research evidence has been gained and to identify how this topic has been examined (Holopainen et al. 2008). The first stage of a literature review includes defining the purpose of the systematic review, formulating a research question, searching the relevant literature, evaluating, and analysing data, as

well as presenting the results (Holopainen et al. 2008). However, this review has some of the main principles of a systemic review, but not all; therefore, it may best be described as a critical review. The main reason for employing a critical literature review is because this is an important early stage in the research process. The researcher then intended to supplement this information by collecting more data using semi structured interviews and the Delphi technique. The planned outcome would then be a nursing practice guideline which would incorporate all these sources of information.

2.2 Searching the literature

There are four steps for searching the literature. The first step involves the identification and formulation of the problem. Four questions were formulated, as the researcher was seeking an understanding of the problems faced by diabetic patients who develop foot ulcers, as well as to develop guidelines to prevent foot complications;

1. What foot care problems do diabetic people have and how do they prevent diabetic foot problems?
2. What do nurses know about foot care and what are current practices for diabetic foot care?
3. What nursing practice guidelines for diabetic foot care do nurses use?
4. Can clinical guidelines improve patient outcome?

The second step of this review was the literature search stage. Following the research question, there are four themes in this thesis, diabetic foot management, knowledge of diabetes/ diabetic foot care, clinical practice guideline for foot care and impact of clinical practice guideline. In general, keywords related to the study were identified to inform the search. The following keywords were used *"diabetic/diabetes foot", "diabetic/diabetes foot care", "foot care in diabetic/diabetes", "diabetic/diabetes foot management" and "diabetic/diabetes foot guidelines"*. With these keywords, the literature on foot care for diabetic patients published between 2004 – 2011, was accessed through to October-November 2011 and researched again in 2013. The British Nursing Index, Cumulative Index to Nursing and Allied Health – PLUS (CINAHL), MEDLINE (PubMed), PsycINFO, Science Direct, IngentaConnect, and Wiley Interscience were all accessed electronically. Nursing journals were also searched to

retrieve relevant data and information related to different aspects of diabetic foot care such as diabetes care, diabetes education, and diabetes foot nursing. Websites dedicated to relaying and discussing information about diabetes were searched, namely: International Diabetes Federation (IDF), International Working Group on Diabetic Foot (IWGDF), Diabetic Foot Global conference (DFcon), The National Institute for Health and Clinical Excellence (NICE) Clinical Guideline, Foot in Diabetes UK (FDUK) and the Cochrane database. This research used such a diversity of databases since diabetic foot care is a focus of study in many medical fields, including podiatry, physiology, orthopaedics, medicine, and nursing.

The search produced 370 full text articles relevant to foot care from medical and nursing practices. However, in order to narrow the scope of the review, inclusion and exclusion criteria, as presented in Table 2.1, were used. This resulted in 34 articles on diabetic foot care and 23 articles on the topic of the impact of clinical guidelines which were used for this review.

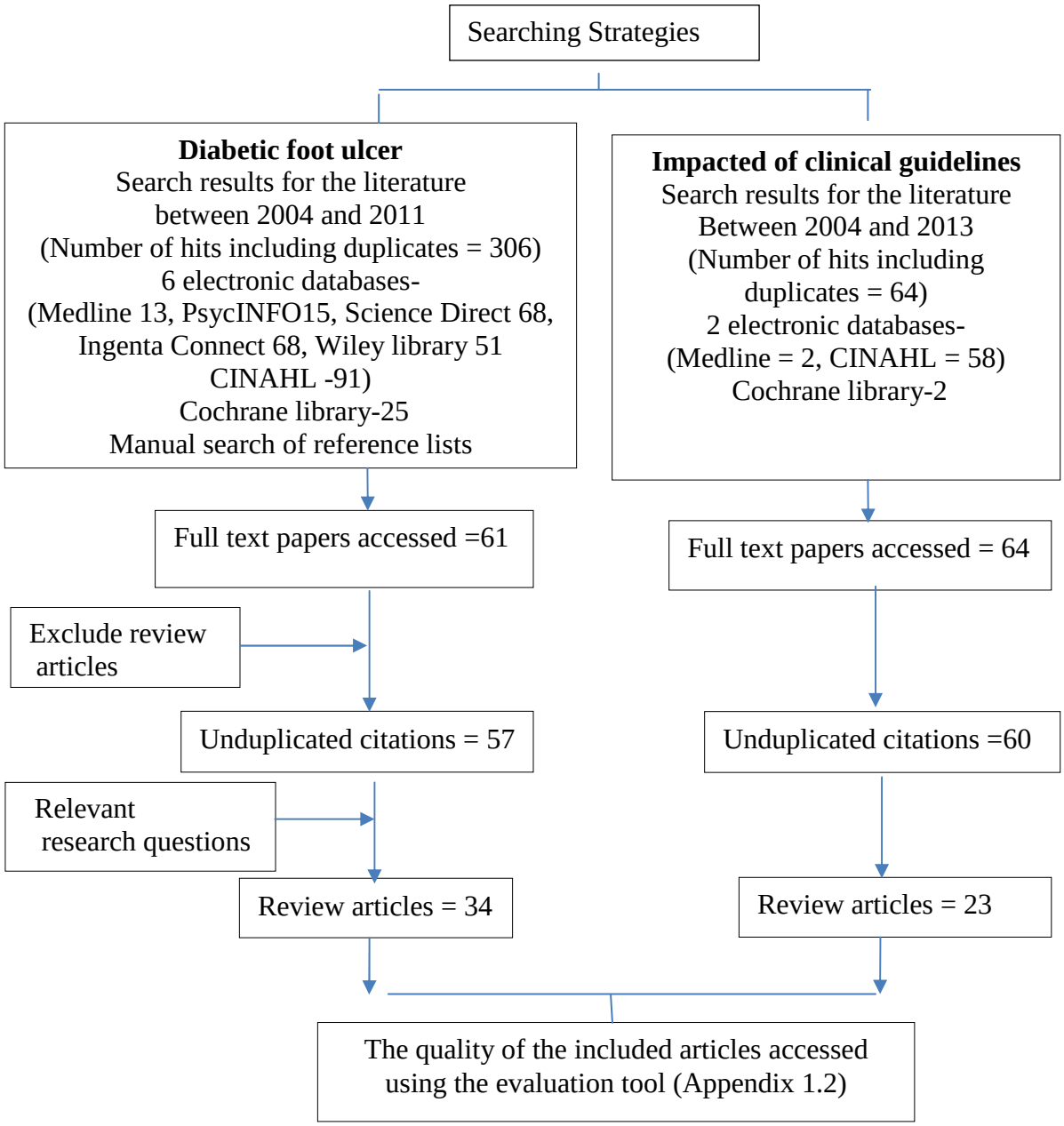
Table 2.1 Inclusion and exclusion criteria for literature selection

Exclusion criteria	Inclusion criteria
Abstracts, proceeding papers Editorial Commentary paper Book review Anonymous work Personal reflection Letter	Published during 2001- 2011/2013 Primary sources Published in English Peer-reviewed Contexts of foot care from diabetic or diabetes or nursing practice regarding foot complications from diabetes

Thirdly, the sources were explored for abstracts, research reports, systemic reviews, texts, guidelines, published and unpublished theses, research, and dissertations and the quality of the 57 selected articles was then evaluated. This process was challenging because of the variety of methodologies that were used by the selected authors and required the researcher to employ different evaluation criteria to ensure the review's appropriate quality. In this study, the quality of each research article was judged using the evaluation tool for qualitative studies and quantitative studies, as outlined in

Appendix 1.2, that the researcher adapted from Letts et al. (2007), Bromley et al. (2003), Coughland et al. (2007) and Cynthia (2005). All 57 identified sources were evaluated using the criteria relevant to both qualitative and quantitative parameters, as set out in Figure 2.1.

Figure 2.1 Search strategies for studies on diabetic/diabetes foot and clinical practice guidelines



Fourthly, an evaluation of the quality of the 34 references relating to the topic of diabetic foot (see further evaluation in Appendix 1.3-1.7) and 23 references relating to guidelines was conducted (see further evaluation in Appendix 1.8). The structure of the literature analysis relevant to diabetic foot care in this study was concluded from all selected evidence, which was then discussed in two groups: aspects of patients and nurses' knowledge, and the education of diabetic foot management. The impact of clinical guidelines was mentioned as a later topic.

2.3 Trends in the literature

A review of the literature that had been published between the periods of 2004 - 2011, identified 34 studies. These included 5 qualitative studies (Coelho et al. 2009, Gale et al. 2008, Martinez and Tripp-Reimer 2005, Mclnnes et al. 2011, Ritchie and Prentice 2011) and 29 quantitative studies (Akca and Cinar 2008, Anichini et al. 2007, Bell et al. 2005, Bowman 2008, Calle-Pascual et al. 2002, Corbett 2003, De Berardis et al. 2005, Desalu et al. 2011, Flood 2009, Fujiwara et al. 2011, Hasnain and Sheikh 2009, Iversen et al. 2008, Khamseh et al. 2007, Naicker et al. 2009, Ogbera et al. 2008, Olson et al. 2009, Perrin et al. 2009, Perrin and Swerissen 2008, Pollock et al. 2004, Quarles 2005, Rerkasem et al. 2004, 2007, 2008, Schmidt et al. 2008, Sharifirad et al. 2007, Smide 2008, Stolt et al. 2011, Tantisiriwat and Janchai 2008 and Wraight et al. 2004).

There are a number of research studies (n=17) as shown in Appendix 1.5 and 1.6 which explore the regular diabetic foot care practices of diabetic patients and the factors relating to diabetic foot practice in patients such as the knowledge of diabetes, risk factors for foot ulcers and foot care practice in foot care including foot problems. Furthermore, the context related to diabetic foot practice was found to contain psychological aspects (Akca and Cinar 2008) as well as socioeconomic issues (Coelho et al. 2009) in diabetic people with foot problems. In addition, very few studies were found that addressed the concept of practice guidelines for foot care (Anichini et al. 2007, Rerkasem et al. 2008, Wraight et al. 2004). Only one article on foot care guidelines was found in the field of nursing (Ritchie and Prentice 2011). Thus, it can be concluded that, supporting evidence related to foot care nursing practice guidelines was

relatively rare. However, four studies mentioned the need for foot care education for patients with diabetes (Bowman 2008, Mclnnes et al. 2011, Rerkasem et al. 2007 and Sharifirad et al. 2007) as well as addressing the issue of medical complications and education. Therefore, this research attempts to develop guidelines for nursing practice.

There are several empirical studies relating to the condition of the diabetic foot (Bell et al. 2005, Bowman 2008, Calle-Pascual 2002, Corbett 2003, De Berardis et al. 2005, Desalu et al. 2011, Fujiwara et al. 2011, Hasnain and Sheikh 2009, Iversen et al. 2008, Naicker et al. 2009, Ogbera et al. 2008, Pollock et al. 2004, Quarles 2005, Schmidt et al. 2008, Tantisiriwat and Janchai 2008 and Wraight et al. 2004). These studies examined many different perspectives, such as foot care management, diabetic foot classification, risk factors for diabetic foot and foot care education, including the impact of clinical practice guidelines. Many concepts of foot care are mentioned in the context of medical doctors, podiatrists and other health care providers, while the evidence grounded in the field of nursing and nurse-based caring is sparse. In addition, another concept was studied in the literature, that of diabetic foot classification. The classification of risk factors in the condition of the diabetic foot was varied. For example, Pollock et al. (2004) used two groups: low risk and high risk group. However, the criteria needed to make allocations to each of the two groups are not clear.

The following sections and subsections present a critical review of the literature on each theme of the research. That was done by presenting evidence relating to the diabetic foot care in general, and then to the problems of diabetic foot care in particular. The review specifically concerns foot care guidelines, using supportive literature regarding differences in existing national foot care guidelines, as well as the impact of practical guidelines, including foot care management. This chapter also discusses the Delphi techniques used in developing the clinical practice guidelines.

2.4 The problem

Foot ulcers are a serious problem for people living with long term diabetes. This foot care complication results from microvascular disease due to long-term hyperglycaemia. This disease is associated with damage to small blood vessels and a malfunctioning of

the nerves resulting in neuropathy (Gale et al. 2008, Rerkasam et al. 2004). Damage to and loss of nerve function is considered the main risk factor for foot ulceration and several diabetic foot problems such as pain, hairlessness, and limited range of motion of feet. Apart from the condition of neuropathy, foot problems can be caused by risky behaviours including: walking barefoot, wearing inappropriate footwear and failing to check feet on a daily basis (Bell et al. 2005, Gale et al. 2008, Iversen et al. 2008, Khamseh et al. 2007, Ogbera et al. 2008, Schmidt et al. 2008, Tantisiriwat and Janchai 2008). Furthermore, foot deformities such as claw toes and bunions are also precipitating causes of foot problems (Rerkasem et al. 2008, Tantisiriwat and Janchai 2008).

The prevalence of foot problems caused by diabetes has been widely studied both locally (within the context of Thailand) and internationally. There are many studies of categories of foot problem in diabetic patients. For example, the study of Rerkasem et al. (2004) identified the prevalence of risk factors in diabetic patients in Thailand. The findings showed that, within the research population of 183 people, 12% suffered from sensory neuropathy, 5.7 % exhibited a history of claudication, and 79.7% had poor glycaemia control. Foot ulceration begins from the stage of skin inflammation and ultimately can result in amputation. Foot problems therefore can cause both serious physical and psychological problems for diabetic patients. To sum up, it concluded that the foot problem of diabetic patients commonly found loss of sensation, neuropathy, foot ulceration, and foot amputation. Importantly, patients also reported feelings of hopelessness (Coelho et al. 2009).

Ogbera et al. (2008) found the prevalence of foot ulcers to be 25%, with the foot ulcers being classified as grades 2 and 3 using the Wagner classification system. They investigated the risk factors of 47 diabetic patients in Nigeria. The risk factors associated with foot ulcers were vasculopathy, neuropathy, blisters as a result of wearing inadequate shoes, and walking barefoot. The sample in this study was small. Nonetheless, the prevalence of foot ulcers was high indicating the likelihood of future foot complications. The limitations of this study are that it contained no report of the duration of diabetic disease in each participant and no discussion of foot factors as a means to predict foot problems.

Risk factors associated with the diabetic foot in developing countries are the same as in the developed countries (Akca and Cinar 2008, Ogbera et al. 2008). The prevalence of risk factors in the developing countries seems to be serious and includes severe problems for diabetic patients relating to foot ulcers, neuropathy problems and vascular problems (Bell et al. 2005, Ogbera et al. 2008, Naicker et al. 2009, Rerkasem et al. 2007, 2008, Smide 2008). Foot problems in developed countries involve a smaller number of foot ulceration and foot amputation cases than in the developing countries (Ogbera et al. 2008, Smide 2008).

However, poor foot care behaviour in people with diabetic foot in both developing and developed countries was not greatly different. This included, for example, less regular foot care (De Berardis et al. 2005, Iversen et al. 2008, and Pollock et al. 2004), not soaking the feet (Bell et al. 2005), walking bare foot (Gale 2008, Pollock el al. 2004) and included not stopping smoking (Khamseh et al. 2007). Risk factors pertinent to foot ulceration in diabetic people should be detected as early as possible and assessed in an effort to eliminate any actual or potential foot problems (De Berardis et al. 2005, Ogbera et al. 2008, Naicker et al. 2009, Wraight et al. 2004).

Early detection and prevention of diabetic foot ulceration is important in diabetic foot care management, in terms of improving foot health and decreasing the cost of foot treatment (Smide 2008, Wraight et al. 2004). In terms of diabetic foot management, the NICE guidelines in the UK (2004) suggested that a multidisciplinary care team could play a role in prevention and diabetic foot care management (NICE 2004). Wraight et al. (2004) reported that foot care management, with a strong MDT, improved foot health and saved costs resulting from foot ulcer treatment and foot amputation

Foot assessment of diabetics involved two strategies: identifying risk factors and classifying the factor based on a relevant assessment tool (Ogbera 2008, Smide 2008). Identifying risk factors included physical assessment, neuropathic assessment, peripheral vascular assessment and foot care activity (Ogbera et al. 2008, Smide 2008). Classifying the factors for predicting foot problems allows one to set the order of priorities of treatment and intervention for the diabetic foot. Classification factors of diabetic foot ulcers can be achieved by several methods. There are differences in

categories of foot risk classification between those set out by the IWGDF (2007) and NICE (2004), RNAO (2004), IDF (2005).

Risk factors include neuropathy, vascular problem, ulceration, and infection (Wraight et al. 2004). The researchers also noted that a significant limiting factor of risk assessment is that no universal assessment tool exists (Wraight et al. 2004). In addition, there are only limited tools relevant to nursing.

Several constraints exist in the use of guidelines for risk assessment including personal and environmental factors (Ritchie and Prentice 2011, Wraight et al. 2004). The effective utilisation of foot assessment in health care provision is affected by the complexity of the foot risk classification. There is no universal guideline for risk classification and risk management relating to diabetic foot care that informs day to day practice. Although risk assessment in diabetic foot care has been used widely in foot care to classify the risk group of patients (IWGDF 2007, Naicker et al. 2009, NICE 2004, Pollock et al. 2004) , there are still no clearly expressed criteria that consider the priority of risk factors associated with developing diabetic ulcer, such as neuropathy and peripheral vascular disease.

Implementation of the best practice guideline of The Registered Nurse Association of Ontario (RNAO 2004) was studied by Ritchie and Prentice (2011) who investigated nurses working in dialysis. They reported that:

1) Nurses could not recall foot assessment procedures set out in the practice guidelines. They faced frustration with the role of carrying out foot examinations, while having many responsibilities in their roles, such as coordinating and streamlining the care process.

2) The time constraints of nurses respond to their roles and responsibilities. The second factor relating to limited utilisation of risk assessment guidelines was time constraints among nurses. Nurses have insufficient time, due to their busy working conditions, nurses have to complete both therapeutic and administrative tasks. Foot assessment is time consuming and consequently, the actual behaviour of inspection is overlooked.

3) Inconsistency of utilisation due to staff administration. According to Ritchie and Prentice (2011), the number of part time nurses and temporary nurses with little experience can cause a low utilisation of foot care practice guidelines.

This study shows that the issue of foot problems is a crucial complication with diabetic patients. In additional, many studies have yielded evidence relating to the knowledge and practice of diabetic foot care in patients. The more knowledge diabetic patients have, the better the foot care practice they will be able to manage (Desalu et al. 2001, Pollock et al. 2004). Furthermore, patients who have more complications need more knowledge of foot care management. In this literature review, it was found that although diabetic foot care education could be provided, the standard of diabetic foot care in practice was not high. As a result, there was some evidence that patient education only has a short–term impact on patient behaviour and knowledge regarding foot care (Perrin and Swerissen 2008, Schmidt et al. 2008) and also that the number of foot care education experiences and exposures improves self-care (Schmidt et al. 2008). It is evident that diabetic patients need significantly higher the level of current educational programmes if they are to gain self-control of their foot care.

3. Foot care management

3.1 Classification of foot ulcers

Classification of foot ulcers has been developed and used for planning treatment, monitoring its effectiveness, predicting clinical outcomes and improving communication among health care providers (Armstrong et al.1998). There is a diversity of systems for classifying foot ulcers. The first classification of foot ulcer to be considered is the Wagner wound classification, a well-established and widely used system for the classification of wounds which uses 6 grades.

Table 2.2 Grading of the Wagner wound classification system

Grade 0	-Pre-ulcerative/post ulcerative/high-risk foot: (No open lesion but may have deformity or cellulitis)
Grade 1	-Superficial ulcer, partial or full thickness lesion
Grade 2	-Ulcer extends to tendon, ligament, and joint capsule/Deep fascia without abscess/osteomyelitis
Grade 3	-Deep ulcer to osteitis/deep with abscess or joint sepsis, osteomyelitis
Grade 4	-Gangrene localised to forefoot or heel
Grade 5	- Whole foot gangrene
	(Source: Oyibo et al. 2001, Armstrong and Lavery 2005, Satterfield 2006)

While this system is useful in classifying ulcers, Rooh-UI et al. (2003) argued that it is too late to aid diagnosis in the cause of the illness if foot ulcers are already present. When an ulcer has been categorised using the Wagner system, appropriate interventions can be implemented. For example, if whole foot gangrene is present, the recommended treatment would be amputation.

The S(AD)SAD system developed by Jeffcoat and team at Nottingham University (Jeffcoate and Harding 2003) is based on the Wagner classification model. This system differs from the Wagner's with the addition of the following risk factors: size (area, depth), sepsis, arteriopathy and denervation (Treece et al. 2004). This classification system only consists of grades 0-3, rather than 0-5. However, Satterfield (2006) reported that this system is too complicated and confusing and requires proper clinical validation, as compared to the Wagner system.

The International Working Group on the Diabetic Foot, primarily a European group, developed another classification system, called The PEDIS system (IWGDF 2007). This classification system was designed as a tool to meet the specific needs of research groups. The PEDIS system (Armstrong and Peters 2001, Satterfield 2006) consists of the following areas of assessment:

P (perfusion): Normal signs/Moderate ischemia/Critical limb ischemia

E (extent/size): Area in cm^2

D (depth of tissue loss): Superficial/Subcutaneous, no bone/Deep, extends to bone

I (infection): No infection/Superficial and localised/Extensive or deep/Systemic involvement

S (sensation): Normal/Abnormal

The University of Texas (UT) wound classification system is an extension of the Wagner system (Armstrong and Lavery 2005, Oyibo et al. 2001 and Satterfield 2006) and evaluates ulcer depth by vital items of cells, the presence of wound infection and the clinical signs of ischemia. This system consists of two sub-classifications: the first classification uses the grades 0 - 3 and second classification tier refers to other burdens on the wound by using an A-D staging. The characteristics of the UT system are shown below.

Grade	Wound Stage
Grade 0 Pre-or post-ulcerative lesion with epithelialisation	Stage A Clean wound indicates non-infected/non-ischemic
Grade 1 Superficial wound not involving tendon, capsule or bone	Stage B Indicates non-ischemic infection wound
Grade 2 Ulcer penetrates through to tendon or capsule	Stage C Indicates ischemia in non-infected wound
Grade 3 Ulcer penetrating to bone or joint	Stage D Indicates ischemia and infected wound.

There are many benefits of each foot ulcer classification. For example, Oyibo et al. (2001) compared the outcome between the Wagner (grade) and the University of Texas (UT) using their grade and stage systems for classifying diabetic ulcers. This finding showed that the UT system was more descriptive and showed a greater association with increased risk of amputation and prediction of healing than the Wagner system (Oyibo et al. 2001). However, Wraight et al. (2004) stated that there were limitations to both systems: the University of Texas model is designed specifically for assessing diabetic foot ulcer, whereas the Wagner classification system was not suitable for use with diabetic foot ulcers. Moreover, both of those systems were limited in their consideration

of classifying of neuropathy and foot complications (Wraight et al. 2004), such as Charcot foot or dry gangrene, which are risk factors for foot ulceration and foot amputation

Both the University of Texas (UT) wound classification system and the Wagner wound classifications have been used in Thailand to assess diabetic foot ulcers (Rerkaserm et al. 2004, Tantisiriwat and Janchai 2008). There is no clear evidence that has reported the effectiveness of each system in the context of Thailand. In this literature review, it can be concluded that that main advantage of the UT wound classification system was that its use reduced the incidence of amputation and increased the prediction of wound healing (Oyibo et al. 2001). However, both systems can justifiably be used to explore consensus in experience of experts in the area of foot care in Thailand. In particular, the goal of this consensus was to achieve agreement of the preventative, diagnostic and therapeutic strategies of the nurse's role. This topic is reported in the next chapter.

3.2 Assessment of foot at risk

Foot assessment is a method of identifying risk factors associated with diabetes and is an essential step in the prevention of diabetic foot complications (Wraight et al. 2004, RNAO 2004). NICE (2004) and IWGDF (2007) both recommend that all diabetic patients should have foot screening by a professional at least once a year (in Table 2.3). The details of foot assessment include a dermatological examination, a neuropathy assessment, vascular assessment and biochemical assessment, which are discussed next (NICE 2004, IDF 2005, IWGDF 2007, Wraight et al. 2004 and RNAO 2004).

A dermatological examination should be carried out which includes the inspection of the patient's skin for dryness, absence of hair, erythematous scales, nail deformities, interspace maceration and ulceration. Dry skin can crack and fissure, which can serve as potential portals of entry for infection. Shiny, hairless skins are symptomatic of peripheral arterial disease. Yellow or erythematous scales could indicate the presence of tinea pedis and yellow and thickened nails could be a sign of onychomycosis. Maceration and moisture should be checked between the patient's toes, as these areas

are especially vulnerable to skin breakdown. Furthermore, ingrown nail edges and very long or sharp nails could lacerate the closest or adjoining toes (IWGDF 2007).

The most common tool for screening for neuropathy is the Semmes-Weinstein monofilament test (SWM) (Wraight et al. 2004). The SWM is carried out at 10 specific sites: the plantar surfaces of the first, third, and fifth digits and metatarsal heads, the plantar midfoot medially and laterally, the plantar heel and the dorsal first web space. Lack of perception of the SWM stimulus at one or more sites is associated with clinically significant large–fibre neuropathy and signals the patient is at risk of ulceration.

Vascular examination of the dorsalis pedis and posterior tibial pulses by a palpation Doppler device may indicate poor peripheral blood flow and peripheral vascular disease (Wraight et al. 2004). Armstrong and Lavery (2005) recommended that peripheral arterial disease is assessed by the ankle brachial index, which measures the systolic blood pressure in the dorsalis pedis, posterior tibial arteries and the brachial arteries, and by calculating the ratio of blood pressure between the dosalis pedis/posterior tibia arteries pressure and the brachial arteries. An ABPI of less than 0.90 shows peripheral arterial disease (PAD) (0.70-0.90 is classified as mild PAD, 0.40-0.69 as moderate PAD and less than 0.40 as severe PAD).

A biomechanical foot assessment should also be performed (RNAO 2004). Watching patients walk will indicate if the patient is at risk of foot complications. Moreover, inspection of the patient's shoes is important to ensure that they fit comfortably and are wide enough to accommodate the span of the foot at the metatarsophalangeal joints. In addition, assessment of the patient's ability to see and reach his or her feet will show if the patients can monitor their feet themselves, or whether they will require special equipment such as a long-handled mirror or sponge brush to reach between the toes.

3.3 Treatment of diabetic foot ulcers

The goal of wound management is to promote wound healing and prevent complications (McDowell et al. 2007). Treatment of diabetic wounds should consider the following eight categories: diagnosis, offloading, infection control, wound bed preparation,

dressings, surgery, adjuvant agents (topical, device, systemic) and prevention of recurrence (Steed et al. 2006). Wound assessment is essential in order to establish the cause and the factors involved in the genesis of the ulcer (Myles 2007). When an ulcer develops, the health care provider must define the cause, wound characteristic(s) and the risk of wound healing delay (RNAO 2004). In case of pressure, off-loading or reducing the high pressure area is absolutely essential to prevent risk of complications such as amputation (Steed et al. 2006). Infection control plays an important role in wound healing. In general, the body can eliminate infected or devitalised tissue through the autolytic process, but a large amount of necrotic tissue, excessive bacterial burden, senescent cells, and cellular debris can interrupt healing and provide an infectious environment. Removing infection, calluses or necrotic tissue can be done by mechanical means (high pressure irrigation), biosurgical means (sterile maggots), enzymatic means (topical enzymes), chemical means (caustic agents), or surgical debridement (Steed et al. 2006, Myles 2007). The method of debridement depends on the status of the particular wound. Regular wound debridement promotes healing with wound base preparation (Myles 2007). Wound dressings should maintain a moist wound environment, which is an effective foot ulcer treatment (McDowell et al. 2007, Myles 2007). A moist wound–healing environment promotes the healing of wounds and diminishes pain (Steed et al. 2006).

4. Knowledge of diabetes/diabetic foot care

Knowledge of the disease among diabetic patients refers to the issue of self-care management and relates to actual and target health outcomes (Gale et al. 2008). Knowledge of diabetic foot is an important factor for diabetic foot management and can be utilised as a predictor of practice in foot care. Heisler et al. (2005) argued that knowledge serves as a prerequisite for the effectiveness of the patient's involvement in diabetic management. Between 2004-2011, there were a number of studies which investigated patients' knowledge of diabetic foot care, including Bell et al. (2005), Desalu et al. (2011), Gale et al. (2008), Hasnain and Sheikh (2009), Khamseh et al. (2007), Naicker et al. (2009), Olson et al.(2009), Pollock et al. (2004), and Sharifirad et al.(2007). Only three empirical studies were found that investigated patients' knowledge (Pollock et al. 2004, Naicker et al. 2009, Desalu et al. 2011). Desalu et al. (2011) stated

that people who have insufficient knowledge of foot care practice are prone to develop foot problems resulting in ulcers, other lower extremity abnormalities and even amputation.

Pollock et al. (2004) carried out a crossed-sectional study to determine the foot health knowledge of 550 diabetic patients in Middlesborough, UK. The study suggested a relationship between good knowledge of foot hygiene and improved foot care practice. Knowledge in this case related to issues such as foot self-examination, footwear inspection, nail care, and foot hygiene. It may seem reasonable to assume that all topics were essential knowledge for appropriate foot care in diabetic patients. However, this study did not show the correlation between knowledge about, and practice of, foot care. The interesting point of this study was that it mentioned knowledge areas relating to lack of sensation in the feet, proneness to ulcer and the adverse effects of smoking on the peripheral circulation: all issues that are essential for, and relevant to, diabetic patients.

The cross-sectional study by Naicker et al. (2009) found that patients with diabetic foot ulcers had lower knowledge scores than those without diabetic foot ulcers. The study investigated the patient's knowledge and practice of 100 diabetic patients in Kuala Lumpur. It assessed the knowledge of foot care involving daily inspection, washing, walking with the bare feet, adequate fitting of the shoes, visiting the doctor for wound care and special shoe demand. The study showed no significant association between practice of foot care in subjects with diabetic foot ulcers and those without diabetic foot ulcers. It concluded that a proper understanding of foot care would help numerous diabetes mellitus patients in day to day life.

Pollock et al. (2004) and Naicker et al. (2009) have documented that many diabetic patients admit insufficient knowledge relative to diabetic foot care practice, but they found that knowledge of diabetic foot in patients, both with ulcer and without ulcer, was not different. In contrast, Bell et al. (2005) also mentioned that patients with more knowledge of diabetic foot and its associated complications have a good standard of foot self-care.

The knowledge levels of those at high risk of developing diabetic foot ulcer were not significantly higher when compared with those at low risk (Pollock et al. 2004). The study compared knowledge of the subject of diabetes for those who had foot ulcer (n=53) and those with no foot ulcer (n=47) and showed no significant difference between the both groups. Those at high risk of diabetic foot ulcer lacked sufficient knowledge on important health issues such as: sensation loss, proneness to ulcer and the effect of smoking tobacco on peripheral circulation (Pollock et al 2004).

One study that suggested knowledge of diabetes was related to the level of an individual's education was that of De Berardis et al. (2005). De Berardis et al. (2005) and Pollock et al. (2004) have shown that patients who have better knowledge had received advice on foot care information. Sources of foot care knowledge included leaflets, verbal communication, videos, and practical demonstration. Knowledge based upon verbal communication was perceived to be the most important for diabetic patients (Pollock et al. 2004).

It is likely that knowledge of the disease in patients is a key factor to predicting patients' self-management performance and guiding their behaviour (Hasnain and Sheikh 2009, Pollock et al. 2004). According to Sharifirad et al. (2007), the result of a quasi-experimental study of 108 diabetic patients highlighted that patients who had increased their knowledge of diabetic foot care had also increased motivation level in foot care. It seems reasonable to suggest that providing more information about foot care excellence and diabetic disease can promote desirable foot care practice (Schmidt et al. 2008).

5. Education

Diabetic foot care education has been identified as essential for preventing foot problems (Kruger and Guthrie 1992). In fact, diabetic education has been accepted since the 1970s as an essential part of diabetic treatment (Mensing and Norris 2003, Siminerio 2006). Although diabetic foot care was included in diabetic management, foot care education has been lacking which has resulted in continued foot problems such as amputation and ulcers.

Education is a key part of the self-management process in diabetes care and in meeting the specific needs of the older population with diabetes (Martinez and Tripp-Reimer 2005). According to Tessier and Lassmann-Vague (2007), education through a multidisciplinary approach may develop glycaemia control in patients with diabetes. Johnson et al. (2005) reported a gap between the lack of knowledge of patients and their inability to take responsibility for the care of their feet. The study suggested that the knowledge gap could be reduced by appropriately trained professionals educating patients, sooner rather than later, about their conditions and how to care for their feet. Mullen and Kelley (2006) agreed with this idea and advocated educational programmes aimed at promoting individual empowerment as a measure to control diabetes.

Keogh et al. (2007) studied the effects of family based interventions to improve outcomes in patients with type 2 diabetes mellitus and to consider, where possible, which components of interventions were most effective. In the UK the most effective programme is the Dose Adjustment for Normal Eating education programme (DAFNE) (Jerreat 2005). Another national education programme is Diabetes Education and Self-Management for On-going and Newly Diagnosed (DESMOND), which is a programme for patients with type 2 diabetes. This programme provides structured self-management group education to individuals newly diagnosed with type 2 diabetes. The base of DESMOND is the chronic diseases management programmes in the United State and European models of care that include structured diabetes education. The effectiveness of the DESMOND educational programme for people with newly diagnosed type 2 diabetes was investigated by Davies et al. (2008) using a multi-centre cluster randomised controlled trial in primary care in the UK. The study concluded that DESMOND resulted in greater improvements in weight loss, smoking cessation and positive improvements in beliefs about illness; however, there were no changes in the level of HBA_{1c} after 12 months after diagnosis. It can be argued that the weight loss, increased responsibility for personal care, improved health belief, decrease in depression scores and the cessation of smoking achieved through this programme, represented a worthwhile benefit and that the measurement of $HbA_{1c,}$ as the traditional marker for improvement, should be critically evaluated.

The National Institute for Health and Clinical Excellence (NICE) in the UK proposed among its guidelines, structured patient education which should be made available to all diabetic patients at the time of initial diagnosis and then as required, on an on-going basis, using a range of educational approaches. The guideline development group proposed a framework of key points that might provide a useful starting point in the education of the patient (NICE 2004-Appendix 26). The DESMOND programme has now been set up in several UK diabetes care units and an evaluation has been carried out by Davies et al. (2008), as discussed earlier.

The cohort and quasi-experimental study of Sharifirad et al. (2007) investigated understanding and predicting patients' intentions to prevent foot lesion and foot amputation of diabetic patients, based on the Health Belief Model. One hundred and eight diabetic patients were divided into a control group and a case group, in order to compare health behaviours. Data was collected by interviews based on questionnaires. Education about intervention factors had been given to patients and one of the family members in the case group. After receiving the intervention, the findings indicated that knowledge, perceived susceptibility, perceived severity, perceived benefits and barriers, and foot care all increased among those in the case group. The limitation of this study was that data was based on the patients' self-reports, so that the researchers were unable to check the validity of reported behaviour of foot care in patients and were unable to evaluate the level of self-efficacy in patients.

6. Best practice pathway of care for people with diabetic foot problems

A pathway is used as a tool for managing and minimising risk in health care. The diabetic foot care pathway (NICE 2004) plays an important role in reducing the severity and frequency of long-term foot complications in diabetic patients. The pathway improves quality of health care by using a process approach to problems and outcome based care delivery. A process approach in the pathway uses risk assessment, involving categorisation of risk and management of the foot based on current evidence. Diabetic patients identified at risk of foot ulcer should receive regular assessments and referral to an appropriate MDT so that they can receive treatment and thus reduce the risk of developing serious foot complications (Wraight et al. 2004).

7. Guideline practice for management of foot care and the prevention of diabetic foot ulcers

Diabetes is a chronic progressive disorder that results in several complications including diabetic foot ulcers and amputations that may affect the quality of life for the patients. It is therefore imperative to develop guidelines for the care of the condition of diabetic foot and the management of diabetic foot ulcers (IWGDF 2007). This guideline development can be useful as a major contribution towards reducing the risk of diabetic foot ulcers.

Since diabetes has been recognised as an international problem, there has been a concerted effort to produce guidelines that are applicable at an international level (IDF 2005). The International Diabetes Federation (IDF) and International Working Group on the Diabetes Foot (IWGDF) have been working collaboratively to develop guidelines on the management of the diabetic foot and the prevention of diabetic foot complications (IDF 2005, IWGDF 2007). Following a critical review of the current literature until 2003, an initial consensus document on foot care was produced following discussions by the IWGDF in 1997, 1998, and 2003 (IDF 2005). The consensus was developed as a result of a special working group which included teams of experts in diabetes and representatives from 82 countries.

This document (IWGDF 2007) addressed the basic principles in diabetic care, described the various diagnostic, preventive, or therapeutic strategies, and explained the organisation of care and the implementation of guidelines. The consensus consists of three parts: policymakers in health care, general foot care specialists and health care professionals respectively. The policy part focuses on the socio-economic impact of diabetic foot and the well-targeted intervention strategies.

The IWGDF, at its Fifth Symposium on the diabetic foot in May 2007 in the Netherlands, produced a revised set of guidelines as a result of available new evidence on the management of the diabetic foot with additional guidance on wound and wound-based management, on footwear and off-loading, and on the treatment of osteomyelitis. The core contents of foot management consists of five key elements: regular inspection

and examination of the foot at risk, identification of the foot care, education of patient, family and healthcare providers, appropriate footwear and treatment of non-ulcerative pathology (IWGDF 2007).

Foot complications are common among people with diabetes, approximately 20-40% patients have neuropathy and about 5% have a foot ulcer (Kumar et al. 1994). The Vincent Declaration proposed a 50% reduction in the number of amputations thus taking a position that amputations are preventable. In a UK study, Deerochanawong et al. (1992) reported that patients who were admitted to hospitals and had amputations had not always received complete foot evaluations in the year preceding the ulcer. Such data were the forerunners to the development of guidelines for foot monitoring and interventions in diabetic patients, ultimately resulting in the development of the initial NICE guidelines for foot care, which were introduced in 2000 and reviewed in 2004.

Moreover, the best practice guidelines for foot ulcers management of Canada, developed by the Registered Nurses' Association of Ontario (RNAO 2004), were also developed. Prentice et al. (2009) examined the implementation of guidelines for the assessment and management of foot ulcers for people with diabetes of the Registered Nurses' Association of Ontario (RNAO). This guideline focused on the management and prevention of complications and initiatives to support foot assessment which provided direction to practicing nurses and health care professionals relating to the issues of practice, education and organisational policy (Ritchie and Prentice 2011, Prentice et al. 2009). It recommended that diabetic peoples be taught to do a daily foot inspection and annually have their feet checked by a health care professional (RNAO 2004).

Developed countries, such as the UK, Canada and the USA, have developed foot care guidelines for diabetic patients whilst developing countries such as Thailand are yet to do so. Those validated guidelines are evaluated and summarised in Table 2.4; the guidelines are concerned with the prevention and management of diabetic foot complications. All the foot assessment procedures include guidelines on neuropathy assessment and vascular assessment.

Table 2.4 Difference of practice guideline for foot care

	NICE 2004	IDF 2005	RNAO 2005
Purpose	Address patient and carer education regarding prevention and management of foot problems associated with diabetes and the definition of increased risk of foot complications. Does not include identification of undiagnosed diabetes or the general management of diabetes	Aimed at healthcare workers caring for people with type 2 diabetes, prevention and management of the diabetic foot	Provide guidance to practicing nurses who provide care in all health care settings for patients both type 1 and 2, who have diabetic foot ulcers
Recommendation	General management approach: 1.Care of people at low current risk of foot ulcer, 2.Care of people at increased risk of foot ulcers 3.Care of people at high risk of foot ulcers 4.Care of people with foot care emergencies and foot ulcers	Recommendations cover: • Standard care 1. Foot assessment (neuropathy, peripheral arterial disease, foot deformity, history of foot ulcer) 2.Classification of the risk level (no added risk, at risk, high risk, foot ulceration or infection) 3. Management of classification level • Comprehensive care • Minimal care	Recommendation consist of 3 topics: 1.Practice recommendation -Patient empowerment and education - Holistic assessment (vascular status, infection, neuropathy, foot deformity and pressure) -Foot ulcer assessment -Goals of care -Management of systemic factors, local factors and extrinsic factors, non-healing diabetic foot wounds -Evaluation of reassess, other therapies 2. Education recommendation -Continuing professional development -Curriculum support and resources 3. Organisation & Policy -System support -Resources -Team development -Partnerships -Financial support -Advocacy

There are difference among the three-foot care guidelines in their purpose, recommendations and setting. It is noted that purpose of NICE (2004) and IDF (2007) is the care of diabetic patients with type 2 diabetes while RNAO (2004) guidelines provide care to both type 1 and type 2 diabetic patients (shown in Table 2.4). Moreover, the RNAO (2004) guidelines focus on only practitioner nurses' role while NICE (2004) and IDF (2005) offers guidance for the MDT. Notably, the recommendations of RNAO (2004) cover practice, education and organisation including policy; whilst, NICE (2004) and IDF (2005) limited their recommendation to practice and education.

The nursing role of diabetic foot care was clearly explained by the RNAO (2004). Procedure and form assessments were clearly explained in the RNAO (2004), while the NICE (2004) and IDF (2005) did not mention assessment forms. It can be argued that the guideline of the RNAO (2004) explained clearly the role of nursing in foot care management, particularly relating to foot ulcer management. Therefore, the RNAO (2004) guideline was used as the framework for exploring nurses' roles in developing this nursing practice guideline.

In addition, all guidelines provided recommendations related to foot assessment and foot risk classification, but there are difference between the three. NICE (2004) and IWGDF (2007) specified the recommendation of foot care management and the details of how to practice foot care, while RNAO (2004) explained the education of diabetic patients in greater detail. It is stated by Frykberg et al. (2006) that patient education is an important component in practice guidelines. Moreover, the RNAO (2004) and IWGDF (2007) stated the need for policy and organisation development, which is essential for the guideline, since this will be required to direct the implementation of practice guidelines. It is believed that good policy recommendations can increase the effectiveness of public service and public policy, improve economic performance, and enhance the quality of life and outcomes in specific areas (CARDI 2012). As a result, influencing policy promoted by the people in positions of authority enables their recommendations to enact real changes to policy and society. However, it is stated that policy recommendations were rarely followed by reporting the effectiveness of their implementation (Ubbink et al. 2012).

Table 2.5 Foot assessment provided in each guideline

Guideline	Item of foot assessment
IWGDF 2007	1. Regular inspection and examination of the foot at risk 2. Identification of the foot at risk 3. Education of patients, family, and healthcare providers 4. Appropriate footwear 5. Treatment of non-ulcerative pathology
NICE 2004	Foot examination consisted of 1.Testing of foot sensation using a 10 G monofilament 2.Palpation of foot pulses 3.Inspection for any foot deformity 4.Inspection of footwear
RNAO 2004	1. Previous history of foot ulcers assessment 2. Loss of protection sensation assessment 3. Structural/ biochemechanical abnormality assessment 4. Circulation assessment 5. Self-care knowledge and behaviour assessment
ADA 2008	1. Sensation assessment 2. Foot structure and biomechanics assessment 3. Vascular assessment 4.Neurological assessment

Foot assessment is the key component of foot examination, central to a consistent and recurrent preventive treatment strategy (NICE 2004). In the review of each guideline, foot assessment was mentioned in different terms of key components and summarised into five issues: neurological examination such as testing foot sensation by monofilament testing or tuning fork (ADA 2008, IWGDF 2007, NICE 2004, RNAO 2004),vascular examination (ADA 2008, NICE 2004, IWGDF 2007) or circulation assessment (RNAO 2004), foot structure (IWGDF 2007, NICE 2004) biomechanics examination (ADA 2008, RNAO 2004), and footwear examination (ADA 2008, IWGDF 2007, NICE 2004, RNAO 2004). The last issue was dermatological examination recommended in each guideline, albeit in different terms and detailed assessment items, such as sensation assessment in ADA (2008).

In addition, self-care knowledge and behaviour assessment was presented as important to assess, especially in the RNAO guideline. It was stated by the WHO (2003) that poor adherence from diabetic patients affected their self-care knowledge and behaviour. Therefore, the level or standard of self-foot education can is a crucial predictive factor in self-foot care in diabetic patients.

The theoretical framework of each guideline is based on its risk assessment model. Risk assessment is an important factor that should be utilised in practice guidelines, as prevention of diabetic foot ulcers may depend on it (Frykberg et al. 2006). All guidelines identified risk factors of foot ulcers in term of neuropathy, foot deformity and foot ulcer including peripheral arterial disease (ADA 2008, IWGDF 2007, NICE 2004, RNAO 2004). It is believed that risk reduction is essential for guideline inclusion and should be able to provide the system of risk reduction, as well as promote effective organisation (Apelqvist et al. 2000).

Table 2.6 Risk classification identification of each guideline

Guideline	Identification of risk	Content
IWGDF 2007	1. Sensory neuropathy and/or foot deformities or bony prominences and/or signs of peripheral ischemia and/or previous ulcer or amputation 2. Sensory neuropathy 3. Non-sensory neuropathy	Not stated
NICE 2004	1. Low current risk 2. At increased risk 3. At high risk 4. Ulcerated foot	-Normal sensation and palpable pulses -Neuropathy or absent pulses or other risk factors -Neuropathy or absent pulses + deformity or skin changes or previous ulcer
IDF 2005	1.No added risk 2.At risk 3.High risk 4.Footulceration or infection	-No loss of sensation, no sign of peripheral arterial disease, and no other risk factor -Neuropathy or other single risk of factor -Diminished sensation plus foot deformities or evidence of peripheral arterial disease or previous ulceration or amputation (very high risk) -Foot ulcer present
RNAO 2004	1. Low risk 2. High risk	-No foot ulcer, no sensory loss, no foot deformities and normal pulse palpation -Foot ulcers or sensory loss or foot deformities or absent pulse palpation
FDUK 2008	1. Current low risk 2. At increased risk 3. At high risk 4. Foot ulcer 5. Foot care emergency	-Normal sensation, palpable pulses -Neuropathy or absent pulses or other risk factor -Neuropathy and absent pulse plus deformity or skin changes or previous ulceration or amputation -Ulceration-chronic/stable -Ulceration-acute/emergency (spreading, cellulitis, critical ischemia, systemically unwell)

	6. Charcot	-Acute Charcot foot
McIntosh 2007 (adapted from IDF 1999, Frykberg et al. 2006)	Risk 1 Low risk	-No increased risk of foot problems -No signs of peripheral neuropathy -No peripheral vascular disease -No foot deformity
	Risk 2 Medium risk	-Peripheral vascular disease and/or peripheral neuropathy -Impaired sensation -Foot deformities
	Risk 3 High risk	-Peripheral neuropathy -Peripheral vascular disease -History of previous foot ulcers or amputation -Charcot changes
	Risk 4 Acute foot problems	-Acute foot problems, ulceration -Ischemia -Infection -Acute Charcot foot

The risk classification system in each guideline was reported in literature differently, but all were intended to direct referrals and subsequent treatment by the specialist team (Boulton et al. 2008). There are different risk classifications: two risk groups (RNAO 2004), three risk groups (IWGDF 2004) and four risk groups (ADA 2008, FDUK 2008, NICE 2004, McIntosh 2007). Most classifications focused on the complication of neuropathy, vascular problems, previous foot ulcers and amputation including foot deformity. The effectiveness of risk classification was studied and it was found that the IWGDF types can function as a tool as a predictor of foot ulcer and foot amputation (Peters and Lavery 2001). The risk classification system of IWGDF (2007) focused on levels of neuropathy, vascular ischemia and foot ulcer or amputation.

Furthermore, there is the work of Lavery et al. (2008) who restructured the IWGDF classification system from a three group to six-group category. The findings showed that this six-pronged model was more effective at predicting diabetic foot complications than the original from the IWGDF (2007).

This current literature review could not find any literature that explored the effectiveness of the ADA (2008), NICE (2004) or RNAO (2004). As a result, the evaluation of advantages using the risk classification models of Peters and Lavery

(2001) and Lavery et al. (2008) provides the best current evidence regarding risks associated with diabetic foot complications as well as predicting foot complications. Finally, the study of Lavery et al. (2008) recommended that the tool of the IWGDF (2007) was a simple and effectively implemented framework which was easy to use as a checklist in medical record keeping. Therefore, this research study chose the style classification based on the IWGDF (2007) and NICE (2004) models, which provided four risk group classifications to inform the development of nursing practice guidelines for foot care of diabetic patients in Thailand.

In addition, multidisciplinary teams each guideline was set up in order to provide special treatment to the patients who were diabetic in their role. The membership of each guideline team was different. Most clinical practice foot care guidelines mentioned the team member consisted of a podiatrist, internist, ophthalmologist, endocrinologist, infectious disease specialist, cardiologist, nephrologist, vascular surgeon, orthopaedic surgeon, nurse (educator, wound care and home care), and pedorthopedist/ orthopaedist (ADA 2008, FDUK 2008, Frykberg et al. 2006, NICE 2004, IWGDF 2007). Meanwhile, the team membership in developing countries, including Thailand, is limited as there is no podiatrist in Thailand (Reraserm et al. 2007).

8. The impact of practice guidelines on nursing practice

Guidelines are developed systemically to assist practitioners in making decisions in appropriate health care for the management of specified clinical conditions (Thomas 1999). Guidelines are essentially diagnostic and treatment guides or logarithms developed by experts in a specialised field. A guideline's objective is to improve the quality of clinical care by minimising harm, producing optimal patient's outcomes, reducing inappropriate variation, and promoting cost-effectiveness practices (AAP 2004).

This section includes two themes: (1) how and why the guidelines work and (2) how and why the guidelines do not work. This review identified twenty-three studies which involved patients and health care professionals in the field of nursing and health science (as shown in Appendix 1.8). Guidelines evaluated included those related to pain

management, hypertension, hypercholesterolemia, neonatal assessment score, asthma, bronchitis, trauma injury, multiple injury and head injury. Ten studies focused on practice guidelines for nurses (Alanen et al. 2008, Cervo et al. 2012, Greene 1997, Higuchi et al. 2007, Kraus 1997, Meerwijk et al. 2010, Prentice et al. 2009, Sae-Sia et al. 2012, Turrill 2000, Webster et al. 2002). Seven studies involved clinical practice guidelines for medical or MDT (Bassa et al. 2005, Coffey et al. 2001, Collen-Emeric et al. 2007, Kotagal et al. 2002, Murphy-Oikonen et al. 2012, Shravat et al. 2006, Thibault-Halman et al.2011). Many kinds of investigations into the impact of guidelines were identified in the literature review sources, examining both their negative and positive effects (Grimshaw and Russell 1993).

The impact of guideline use on clinical practice had been shown in the literature in a number of related fields. The potential significance of clinical guidelines was shown in Bassa et al. (2005), where the guidelines positively affected clinical outcomes of hypertension management and prevented or limited the complications experienced by patients. Patients with hypertension achieved the treatment goal and the median of cholesterol values in patients decreased.

Changes to process of care was mentioned in many studies (Thibault-Halman et al. 2011). The referral system of special care can be improved (Bassa et al 2005). Treatments could be given to patients more promptly. For example by doing this, Kotagol et al. (2002) evaluated clinical practice implementation for bronchitis and found a decrease in the number of patients using the treatment such as albutenal or a bronchodilator.

Reduction of the average cost of treatment can be achieved. In addition, costs of visits by patients and laboratory assessments were reduced by Bassa et al (2005) and Kotagal et al. (2002). Decrease of the length of hospital admission could be shown Kotagal et al. (2002), and Murphy-Oikonen et al. (2012).

Guidelines have been shown to increased quality of health care (Apelqvist et al. 2008). For instance, guidelines for infants with neonatal abstinence syndrome improved identification of symptoms based on a toxicology screening protocol (Murphy-Olikomen et al. 2012). Moreover, guidelines helps the workload of health care providers

(Shravat et al. 2006) which promoted better individual care received by patients. Sae-sia et al. (2012) stated that the impact of the implementations of multiple injury guidelines increased the discovery of missed injury.

From the above literature, it can be argued that guidelines are useful and were recommended for use in allied health science and medicine. In this study, guidelines for diabetic foot care were explored with particular reference to nursing care.

In term of diabetic foot care, there was some evidence of research into clinical practice for foot assessment (Kraus 1997, Anichini et al. 2007, Prentice et al. 2009, Ritchie and Prentice 2011). The findings indicated a positive impact on the foot assessment process and a decrease in the incidence of lower extremity amputation. For example, Prentice et al. (2009) utilised the diabetic foot management best practice guidelines to determine the impact of quality of life, foot ulcer incidence, recurrence, and amputation rate. The study showed that the recommendations contained in the clinical practice guidelines changed the wound status for the better and improved the grade of the wound.

Anichini et al. (2007) studied the implementation of international consensus on diabetic foot care in a-five-year study. The findings stated that the higher the percentage of patients who were seen by a MDT, the greater the decline in the incidence of foot amputation.

Kraus (1997) studied the effectiveness of nursing practice guidelines for preventive diabetic foot care. The finding showed that the cost of implementing practice guidelines resulted in an increase in cost, but could be justified by the cost savings in the prevention of lower extremity amputation. Furthermore, the effect of using practice guidelines improved diabetic foot care knowledge as well as the diabetic foot care behaviour of diabetic patients. Ritchie and Prentice (2011) also conducted research to assess a change in practice relating to the issue of foot assessment and nurse’s role in a haemodialysis unit, where guidelines were seen as a tool for communication with physicians. Moreover, the participants agreed that the impact on wound healing was positive.

As mentioned above, the clinical practice guidelines affect the process of care, including foot care (Kraus 1997). Therefore, it seems certain that diabetic foot care guidelines would be a benefit to foot care management in diabetic patients, particularly with a view to preventing foot complications and decreasing the cost treatment for foot ulceration and foot amputation.

However, some research produced uncertain finding as to whether clinical practice guidelines would or could improve or influence the health system (Cheah 1998). Clinical practice guidelines have become a common discussion point in medical circles and have been recommended for care due to their impact (Cheah 1998). Although the positive impact on treatment was mentioned, some evidence suggested that clinical guidelines lacked effectiveness. For example, the findings of Coffey and colleague study (2001) failed to show any positive impact as a result of following a set of alcohol withdrawal treatment guidelines.

However, there are certain factors that may benefit from the implementation and effectiveness of practice guidelines:

-Leadership is known to have a key role for moving best practice guidelines into nursing practice (Matthew-Maich et al. 2011); it is argued by Marchionni and Ritchie (2008) that leadership is a key element influencing guideline implementation. Similarly, the study of Matthew-Maich et al. (2011) stated that frontline leaders foster and promoted practice guidelines in order to make the guidelines happen and sustain the utilisation of practice guideline.

-The available of time was also associated with the effectiveness of clinical guideline implementation (Greene 1997). Turrill (2000) argued that time impacted heavily on the ability of nurses to practice the use of evidence based guidelines. There is evidence that following the guidelines requires the spending of more time to practice. Consequently, nurses mentioned that a lack of time and the cooperation of physicians and administrators are important influences on their ability to maintain the pain management practice; guidelines were a good way to help them enhance their caring roles (Greene 1997).

-Organisation is another key factor to support the implementation and the sustainability of best practice guidelines (Marchionni and Ritchie 2008); these researchers also stated that leadership needed a support culture where learning is valued. These points, when coupled with transformational leadership, may be key factors.

-Communication among health care providers and across shift time has also been shown to be important (Collen-Emaric et al. 2007). Implementation activities relating to guideline effectiveness frequently produce only moderate improvement in the quality of care. It is important to study a specific guideline programme in detail to learn from their successes and failures (Richard 2001). Many styles of implementation have affected the outcome of patients and the process of care. There is research that mentioned the impact of implementation style on the effectiveness of clinical guidelines. Alanen et al (2008) studied the effective implementation style involving hypertension treatment guidelines. They evaluated the different styles of implementation, between disseminators and implementers, in each health care centre. The procedure of implementing these particular guidelines comprised the adoption of the guidelines, participation in guideline development, updating the guidelines, informing professionals, informing the guideline team, familiarisation of staff, staff training, informing patients and informing participants. In comparison, without the adoption of a guideline team, the implementation style of Coffey et al. (2001) which used a MDT, did not improve the patient outcome. Strikingly, Coffey et al. (2001) used the medical champions to educate the medical staff to present the guidelines' contents at medical assemblies.

Educational outreach among patients and implementers was identified as a consistent and effective strategy for implementing best practice guidelines (Thomas et al. 1998). Educational outreach is the activities of providing education and services including personal practitioner training in order to provide information. There are several studies relating to education outreach of patients and implementers. Alanen et al. (2008) used the educational outreach method of informing teams and staffs who were involved in using the clinical guidelines for alleviating hypertensions, discussing them at professional meetings or multidisciplinary meetings, as well as informing patients of the hypertension guidelines and suggested life style changes. The most positive element of

this guideline implementation was the written material given to patients. Similarly, Kotagal et al. (2002) implemented guidelines to manage bronchitis guidelines by a mixed method process. This process consisted of firstly educating by medical grand round and presentation at meetings of community primary care physicians, house staff training sessions, nurse training forums, poster displays and hospital news publication. Secondary by reinforcing guideline principles, including a study coordinator at the daily round in order to track eligible patients and resolving any problems inhibiting guideline implementation. Lastly, identifying a physician champion was used to support the necessary changes.

Mitchell et al. (2011) who attempted to implement guidelines without first training staff reported unsatisfactory results. Similarly, the guidelines used by Coffey et al. (2001) consisted largely of new assessment tools that were used by medical staff and nurses, and no changes in the recipients' status between pre and post guideline implementation were found. Pre-implementation of this guideline did not use staff training or staff familiarisation with the guideline, which resulted in misunderstanding of using the new assessment tool.

In summary, staff training is essential for the success of any initiative relating to new guideline implementation. Moreover, leadership of people in key positions plays a significant role in guiding the changes of guideline implementation (Marchionni and Ritchie 2008). Leadership was defined as the process of influencing individuals to achieve a goal or their goal. The successful leadership success style of nurses, which is necessary for the effective implementation of guidelines, was transactional and transformational leadership (Marchionni and Ritchie 2008). It is stated that transformational leadership can contribute indirectly to improving the quality of patient care. Therefore, it is strongly suggested that leadership skills should be promoted in order to achieve optimal effectiveness of guideline implementation.

9. The gap of knowledge in diabetic foot

The critical review of the literature has shown that diabetic foot care is complex and that several disciplines are involved in managing diabetes and preventing complications result in from the illness.

In this literature review, there are reports of diabetic people faced with lower limb complications such as foot care deformity, foot ulcer, foot amputation, foot pain and impaired foot sensation (Smide 2008, Rerkasem et al. 2008). Diabetic people in the developed countries were found to have fewer foot problems than similar patients in the developing countries. The latter cohort of patients appeared to have insufficient knowledge of foot care, as mentioned above in section 4, for example, not understanding the meaning of foot care (De Berardis et al. 2005). Although the foot education was provided, the foot care behaviour of diabetic patients was not performed promptly or correctly (Sharifirad et al. 2007, Mclnnes et al. 2011).

There is a limited amount of literature relating to nurse's knowledge and practice involving foot care. No reports indicating the level of nurses' knowledge or practice regarding foot care were identified. There is only one report of the effectiveness of educational interventions by nurses. Increasing the nurses' knowledge of foot and nail care improved the standard of elderly patients' foot care and reduced their foot pain (Stolt et al. 2011). It is fair to suggest that the knowledge of foot care relevant to diabetic people would be an asset nurses should acquire.

The main role of a nurse in foot care is the management of all aspects of the diabetic foot, especially in the prevention and treatment of diabetic foot ulcers (Edmonds and Foster 2005). Many authors suggest nurses have particularly important roles in the education and screening of patients, as well as in the prevention and management of ulcers (Johnson et al 2005). Styles of foot care education and screening of patients were explained in literature as follows:

Most Diabetic foot care in clinical practice of nursing consisted of foot care assessment and foot care education. The process of foot care assessment was conducted in and by a

MDT. Foot assessment, which nurses practice in the clinical context, encompasses the issue of neuropathy, vascular problems, biochemical problems and foot ulcer history, including foot risk classification (RNAO 2004). There are many classification systems of risk factors and categories of risk factors informed by disease, patient population and country. For example, wound classifications were used to identify the severity of diabetic foot ulcers in order for the patient to receive prompt treatment. Both the Wagner classification system and the University of Texas system were reported in literature, where it was argued by Wraight et al. (2004) that the Texas system of classifying diabetic foot ulcer reduced the incidence of foot amputation and promoted the prompt treatment of each foot ulcer. It is stated by Sharifirad et al. (2007) that foot care education, provided by nurses for the diabetic patients, consisted of knowledge of foot care, daily foot care appropriate footwear and self-foot inspection. The amount of foot care education which was considered to be optimal for diabetic patients was not mentioned in this literature reviewed by this author.

There are gaps of knowledge of foot care in patients, as well as the nurses who provide diabetic foot care and foot care practice for diabetic patients. This review was unable to identify any report to explain the correlation between the knowledge of foot care in nurses and patients. While there was evidence of patient education being provided to diabetic patients, foot care practice and behaviour were not properly applied or were evidently improvised. It is unclear whether the style or model of foot care education affects foot care behaviour. Although some studies show the patient education sessions alone can improve the foot care behaviour, it seems that the style of foot care education should use mixed methods and provide repetition by health care providers (Schmidt 2008). It is apparent that foot care education affects foot care practice in diabetic patient in the short term only. This is supported by Johnson et al. (2005) that education for foot care provided too much information and patients can be overwhelmed. Therefore, it concluded that foot education did not increase foot care practice in long term.

A guideline for preventing foot complication was produced for use around the world to reduce inappropriate variations in practice (Thomas 1999). In the literature showed that the utilisation of guidelines can affect the incidence and prevalence of disease, treatment cost, continuous treatment and care including decision making. Many guideline from

the UK, US, Canada and the work of the IDF all mentioned the importance of preventing foot ulceration and promote the role of the health care providers in providing foot care and foot education for patients. Only one guideline for foot care in literature promoted foot care by nurse practitioner specifically (RNAO 2004). All guideline identified the importance of foot assessment including neuropathy assessment, vascular assessment, foot education, and improving referral system. However, guidelines vary in the classification of risk category and the method of developing guidelines, such as literature review, consensus conference, and how to revise existing guidelines. There is the evidence of implementing a foot care guideline in the study of Prentice et al. (2009). It concluded that a foot care guideline influenced the decreasing incidence of foot ulceration and foot care management service.

This literature review, found no evidence relating to the current state of foot care practice in diabetic patient of Thailand, including the need of diabetic patients. Therefore, to understand the current foot care, the first aim of this study is to explore the current practice of foot care from the perspective of patients, nurses and educators by interviews. The optimal model in the guideline can then be developed to promote standardised and long term care for diabetic patients. In addition, the literature review did not find any national nursing guidelines for foot care in Thailand.

Having completed this review, it can be concluded that the optimal model for such a guideline to prevent foot complications should include foot care education, underline foot care assessment, and identify risk factor categories which should all be explained in the foot care guidelines for diabetic patients.

The main outcome for this project will draw on these findings to develop a nursing practice guideline for a foot complication prevention programme in the context of Thailand.

10. The Delphi technique

This section explains the approach and methodology of the Delphi technique. It gives a comprehensive description of the approach and then goes on to explain its application in research. The application of this technique as a research methodology is not new; it has already generated controversies among researchers in terms of its methodology, regarding certain definitions and distinctions, as well as the relative merits of quantitative and qualitative analysis of results. However, the general consensus regarding its application in research is positive.

This section is organised into eight parts relevant to the Delphi technique: 1) search strategy of the Delphi technique, 2) definition of the Delphi technique, 3) types of the Delphi technique, 4) the Delphi technique in nursing and health care, 5) using the Delphi technique to develop practice guideline, 6) panel experts in the Delphi technique, 7) the Delphi process, and 8) the advantages of the Delphi technique.

10.1 Search strategy of the Delphi technique

A systematic literature search of the Delphi technique was conducted, by accessing the electronic library at De Montfort University, Leicester, UK. Firstly, the researcher identified the problems associated with using the Delphi technique. The following questions were addressed:

1. What is the Delphi technique and how is this technique used in the nursing research?

2. What processes does the Delphi technique employ?

3. How is the Delphi technique used?

Secondly, keywords related to this technique and databases were identified. Here the Cumulative Index to Nursing and Allied Health (CINAHL) database, papers in PsycINFO, Medline and journals in Science Direct were searched using the key words *"Delphi technique" and "nursing and health care."* The literature sources on the Delphi technique for nursing were limited to those published between 2000-2010. The

earliest paper located was published in 1974. One other source that was searched was Science Direct, from which relevant data was also retrieved.

This step in the literature review yielded 249 papers. Exclusion and inclusion criteria were used as presented in Table 2.7 to narrow the review's scope (Figure 2.2).

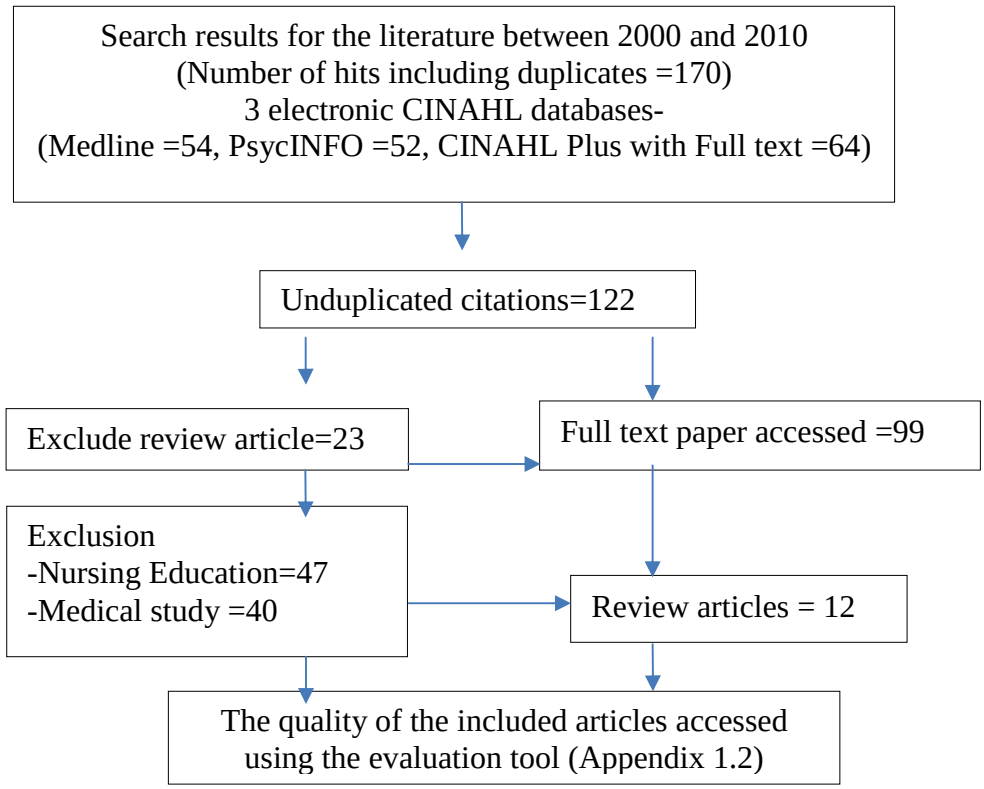
Table 2.7 Exclusion and inclusion criteria for selecting literature of the Delphi

Exclusion criteria	Inclusion criteria
Abstracts, proceeding papers Editorial Commentary paper Book review Anonymous work Personal reflection Letter	Published during 2000-2010 Primary sources Published in English Peer-reviewed

In the third stage or step, the relevant articles were read thoroughly the abstract and the quality of 12 selected articles was appraised. This process was challenging because of the variety of areas in which the Delphi technique has been employed.

The fourth step, presented in this section, involved the qualitative evaluation of the literature reviewed were structured in this section. The quality of each research article was evaluated using the tool in Appendix 1.2 that is the same as that employed in diabetic foot evaluation. The studies used to review in this section are described in Appendix 1.9 to1.12.

Figure 2.2 Search strategies for the Delphi technique



10.2 Definition of the Delphi technique

The Delphi technique was developed by Dalkey and Helmer in the 1950s. It was initially developed as a U.S military project which aimed to forecast the impact of technology on warfare through soliciting expert opinion on the probability and possibility of enemy attacks. *"The goal of the project was to solicit expert opinion to the selection, from the point of view of a Soviet strategic planner, of an optimal U.S industrial target system and to the estimation of the number of A-bombs required to reduce the munitions output by a prescribed amount,"* (Dalkey and Helmer, 1963, p 458). It has been used ever since with various modifications. (Goodman 1987, Keeney et al. 2001, Skulmoski et al. 2007).

The Delphi technique is a research method using group processes that elicits the opinions of experts throughout group consensus by the use of questionnaires (Keeney et al.2001, Hsu and Sandford 2007). The effective group consensus allows a structured

group of participants in order to deal with complex issues and is said to be more reliable, when it comes to results, than an unstructured group. Hsu and Sandford (2007) place greater emphasis on group process, which results in gaining data for the purpose of discussion, knowledge and predictions, whereas, Linstone and Turoff (2002) defined the Delphi model as a technique to gain the most reliable consensus from experts.

The technique comprises several rounds of data collection from a panel of experts, through the use questionnaires and surveys (Keeney 2009). The method basically involves a facilitator/researcher sending out a survey or questionnaires to a panel of experts. The facilitator then collects their responses, analyses them and identifies common and conflicting viewpoints. A summation of the position of the whole group is then sent to each participant, along with the participant's own position, and some more questions. This process continues until a "majority consensus" on the subject is reached.

Gupta and Clarke (1996) describes the Delphi technique as suitable for qualitative study as it elicits, refines and draws upon the opinions and knowledge of experts. It is useful for achieving the objectives of planning, policy analysis and long-range forecasting. While Skulmoski et al. (2007) defined the Delphi method as an '*iterative process to collect and distil the anonymous judgements of experts using a series of data collection and analysis techniques interspersed with feedback. The Delphi method is well suited as a research instrument when there is incomplete knowledge about a problem or phenomenon'* (p1). It is argued by Mead and Mosely (2001a) that the Delphi process is an approach which is a determined or fixed way to reach a goal.

This thesis will adopt the definition presented by Skulmoski et al. (2007) towards achieving the objective of developing the foot care guidelines. Three key characteristics of the Delphi technique are suitable for this research. The first key proposed characteristic involves experts who are used to provide experience and knowledge. Experts in this study specialised in the diabetic foot or were involved in diabetic foot in order to provide the diabetic foot evidence. Experts consist of multi-professional members who are not only nurses but also medical doctors and physiotherapists. These groups provided the rich data for developing the foot care guidelines for diabetic patients. Secondly, a characteristic is the anonymity of experts' replies, which are used

to provide reliability of data. All experts gave their opinion independently. Thirdly, the iterative process is utilised to require consensus and agreement between the experts in order to develop nursing practice guidelines for foot care.

The following sections will describe and discuss the basic elements and features of the Delphi technique.

10.3 Types of the Delphi technique

There are several types or forms of the Delphi technique. There are classical Delphi, modified Delphi, and others variants. Classical Delphi refers to the technique as originally designed (McKenna 1994, Keeney et al. 2001). Rowe and Wright (1999), Vernon (2009), and Hsu and Sandford (2007) characterise the Delphi method by four key features; anonymity, iteration, controlled feedback and statistical aggregation of group responses. Then there is the modified Delphi where, as the name implies, the classical Delphi technique is modified with the aim of managing the structure of the method; for instance by giving panellists some pre-existing information in order to narrow the scope of the subject or even to improve the response rate.

The Delphi technique is an acceptable research paradigm used widely in the health and nursing research field. Custer et al. (1999) make the distinction between the classical Delphi and the modified Delphi. Both are similar in their overall basic features i.e. expert panel, iterations, arriving at a consensus. The major modification consists of beginning the process with a set of carefully selected items. Large amounts of information from an open ended first round tend to lead to numerous subsequent rounds. This tendency for the classical Delphi to be ‘unstructured’ makes it necessary to modify the method by, for example, giving panellists some pre-existing information in the first round. Pre-selected items may be drawn from various sources including related competency profiles, synthesised reviews of the literature and interviews with selected content experts (Custer et al. 1999). The modification gives the advantage of improving the response rate of the initial round, as well as providing a solid grounding in previously developed work (McKenna 1994). It also improves the control on of the feedback process. Moreover, Boulkedid et al. (2011) explained the difference between

the classical Delphi technique and the modified Delphi technique with questionnaires. The classical Delphi employs the self-administer questionnaires without meeting of panellists, while the modified Delphi technique uses the combination of the self-administered questionnaires and the expert's meeting in order to rate the indicator or discuss the result.

The study by Keeney et al. (2010) used the e-Delphi technique to find the consensus of appropriate benchmarks for effective primary care based nursing service. The authors employed two rounds of questionnaires circulated e-mail to 67 experts. The e-Delphi technique has been chosen in their study because the email could be accessed easily and this method provided rapid feedback and responses.

10.4 Delphi technique in nursing and health care

This section will consider the use of the Delphi technique in nursing and health care and the justification for its selection, based upon which the study was conducted. Various studies (as shown in Appendix 1.9) have been conducted that employ the Delphi technique in nursing and healthcare.

The Delphi technique was widely selected in order to elicit the experience or opinion of experts to find consensus in special issues, such as to identifying an issue's core components. Studies which used this method include; Chang et al. (2010), Efstathiou et al. (2007), Irvine (2005), Jirwe et al. (2009), Linde et al. (2005), Lofmark and Thorell-Ekstrand (2004), Morita et al. (2005), Peter, J et al. (2001), Rolley et al. (2010) and Wilson et al. (2010). For example, in Jirwe's (2009) study, the views of nurses on the first round were gained by using semi structured interviews to identify specialist knowledge, skills and attitudes, which were analysed to build the statement. Morita and her colleagues (2005) structured their questionnaire from the evidence gathered from a literature review of palliative sedation therapy. The study of Linde et al. (2005) combined a systemic literature review, interview and survey for developing the first round of opinion gathering.

The aim of the study by Irvine (2005) was to establish the competencies of district nurses in a health promotion role, as there was very little available published evidence concerning this issue. Irvine chose this design to find the competencies of district nurses by selecting specialist experts related to the respective fields of interest. The author used the Delphi technique to reach a consensus of opinion among experts. The researcher used three rounds which consisted of open-ended questionnaires in the first round and two questionnaires, one each for rounds 2 and 3, in order to identify component skills. This study showed that the modified Delphi technique was an effective research tool when consensus was required to improve clinical practice, in the absence of formal research evidence. Jenkins and Smith (1994) argued that complex fields of practice, such as competencies, can best be researched from the current evidence and peer reviews of the group of clinical practitioners. The study used purposive and snowball sampling. The panel of experts was made up of 72 members and was considered adequate to provide reliable information. The study showed that the rates of panel feedback at each round were 86%, 87.5%, and 78.9%. These high response rates of panel feedback showed the validity of the Delphi technique.

Jirwe et al. (2009), attempted to identify the core components of cultural competence in Swedish nursing using a modified Delphi technique as such a study had not previously been conducted. Four rounds of Delphi technique were designed to find agreement. The participants consisted of registered nurses, nurse lecturers, and nurse researchers who had experience and knowledge of multicultural nursing. The authors used the modified Delphi to explore current practices among practitioners in Sweden. The panel of experts was recruited from different professional areas. The analysis of this study shows that the modified Delphi technique is effective as a means of identifying and developing core competencies.

The study of Peters et al. (2001) explored the perceptions of nurses on their current and future roles in community care for type 2 diabetes patients. Using two rounds of the modified Delphi technique, the researchers gained consensus from two different nurse groups: practice nurses involved in diabetes management and diabetes specialist nurses. The authors chose the Delphi technique because the study produced and united the opinion of a group of experts with controlled information exchanges with a group of

people in a non-face to face process (Johns and Hunter 1995). To ensure the reliability of the study, the sample of nurses selected to take part in the study was made up of current nurses working in the field of diabetes.

Chang et al. (2010) conducted a study using the Delphi technique to validate an instrument for measuring advanced practice nursing roles delineation in an international contemporary health service context. The paper was part of a study seeking to develop an operational framework for assigning advanced practice nursing (APN) roles. The Delphi panel reviewed the activities in the Strong Model of Advanced Practise Nursing Role Delineation tool. The consensus cut-off validated the Strong Model of APN Role Delineation tool as fit for depicting the dimensions of practice of the advanced practice role in an international contemporary health service context.

In summary, the above studies (Jirwe et al. 2009, Irvine 2005, Peters et al. 2001, Chang et al. 2010), and guideline development studies by Barker and Burns (2001) and Linde et al. (2000) and a nursing guideline study by Barker and Burns (2001) all supported the notion of using the classical Delphi method in their study. Nursing guidelines by Rolley et al. (2010), Barker and Burns (2001), Ostaszkiewicz et al. (2008) supported the use of the modified Delphi technique as a method of identifying and developing core competencies in the field of clinical practice. They were able to firstly explore the current levels of knowledge and competencies among clinical practitioners and then to develop guidelines in medical and nursing care or find judgments relating to a specific issue.

10.5 Using the Delphi technique to design guidelines

The Delphi technique is an ideal tool for designing medical and nursing practice guidelines, particularly because of the inherent feature of a converging consensus of knowledge of, and based upon, the real world (Hsu and Sandford 2007, Powell 2003). Developing guidelines for medical or health care management in many countries has often been a product of methods involving consensus agreement. In developing nursing practice guidelines, the Delphi technique can be used to widely explore experience and knowledge from available evidence or through the experience of experts, to debate new

knowledge and to achieve agreement. Experience and evidence of expertise is the base of knowledge to be used in developing guidelines.

In the literature review of this study, five articles in Appendix 1.10 (Linde et al. 2005, Morita et al. 2005, Rolley et al. 2010, Ostaszkiewicz et al. 2008 ,and Barker and Burns 2001) were identified which investigated the application of the Delphi method in the task of developing guidelines. Three empirical studies (Linde et al. 2005, Morita et al. 2005, and Barker and Burns 2001) set out to develop medical guidelines while two (Rolley et al. 2010, Ostaszkiewicz et al. 2008) looked at developing guidelines for the nursing practice.

In an Australia and New Zealand collaboration, Rolley et al. (2010) used the Delphi technique for revising recommendations on nursing practice guidelines of people with percutaneous coronary intervention. Interviews were conducted to develop guidelines before applying the Delphi method. The expert panel in the study was chosen because of experience, such as cardiovascular experience and job position in policy groups. All respondents were registered nurses with an average of 12 years of clinical experience in the cardiovascular setting. Having defined a controlled process for selecting experts and a clear step by step consensus process, the researchers organised focus groups, with face to face interaction, which produced much more in-depth discussion and generated reliable data suitable to the research focus. The focus groups were also used to acquire reports of the personal experiences and beliefs that related to the study purpose.

The experience of experts yielded the knowledge and evidence upon which to base the guideline development (Murphy et al. 1998). Expert identification, degrees of expertise and sampling procedures are important components of Delphi terminology (Keeney et al. 2011). The author set up relevant criteria for selecting experts that increased the validity of data and enhanced a rigorous development of the desired guidelines. The number of expert panel members was 41, a sample size suitable for the aim to study and to ensure the content validity of data. Keeney et al. (2011) mentioned that the number of panel member was influenced by the purpose of the research, available resources, and design selection. The Snowball technique was applied for selecting the panel of experts, as can be seen in Rolley et al. (2010). Potential members were contacted for

representation and required to express interest by email. Content analysis was applied to the data gleaned from the expert discussion, a good method when dealing with qualitative data for extracting themes related to the purpose of developing guidelines. In developing the question, the researcher used interviews and literatures review to develop questionnaires.

Ostaszkiewicz et al. (2008) used the Delphi technique to elicit information and expert comment relating to problem solving, planning, and decision making in nursing assessment and management of urinary retention. The study was conducted in order to create knowledge of guidelines targeting the assessment of elderly groups. The authors developed a draft of the guidelines by reviewing the literature. Multidisciplinary experts were then invited to give their comments for each recommendation in the guideline to establish a consensus regarding the draft guidelines. Three Delphi rounds were carried out but no details were mentioned. A criticism of this study is the lack of the detail about the protocol for selecting experts and process of employing experts which should be a very rigorous aspect of the Delphi technique. It is claimed by Murry and Hammons (1995) and Beretta (1996) that the reliability in the Delphi technique depends to a great extent on the composition of the expert panel and its sample size.

To develop guidelines in the UK, Barker and Burns (2001) used the classic Delphi technique to develop guidelines for patients treated with the llozarov Fixation. The author mentioned no review of standards for or of these guidelines. Literature reviews were chosen and incorporated into the draft guidelines. The Delphi technique process used three rounds via questionnaires to refine and elicit the opinions of experts. The authors used the unstructured and open-ended questions in the first round. In the second round, the steering group was set to frame the questions and reflect the panel's opinions for preparing the guidelines. The third round formulated the strength of agreement of panel experts and hence clinical guidelines were able to be designed. This study represents a good example of the process of setting other coordinated teams to confirm the agreement of the experts. The authors confirmed the validity of data with the steering group. Using panels is appropriate as a way of developing guideline.

Linde et al. (2005) used the modified Delphi technique to develop guidelines for prescription of lower-limb prostheses. The authors developed the questionnaires undertaken a systematic review of relevant literature, a survey of national clinical practice and interviews with experts. Two internet rounds with questionnaires were conducted. This study is a good example of how to develop a draft of guidelines by using interviews, a literature review and questionnaires, because such a process produces more reliable data.

The study of Morita et al. (2005) used the Delphi study to build a clinical guideline for palliative sedation therapy in Japan. The aim of this guideline was to guide clinicians to adequately perform sedative procedures and ensure the best quality care for terminally ill patients. The panel of experts was selected from a multidisciplinary group consisting of palliative care physicians, oncologists, nurses, anesthesiologists, bioethicists, medical social workers and lawyers. The Delphi based investigation was conducted with three rounds before which a literature review was used to draft guidelines. The 145 statements in the draft version were graded on a 9-point Likert scale and sent to the panel. After the first round, face to face discussion was used to elicit different panel opinions. A revised questionnaire was sent to all experts to find consensus and to adopt a provisional version of guidelines. The guidelines were reviewed by an external group comprising specialists, end-users and bereaved family members. Another group of national experts in different groups, which consisted of an oncologist, a palliative care physician, an anaesthesiologist, a psychiatrist, a palliative care nurse and bereaved family members examined the provisional guidelines and gave free form comment. The methodology allowed for a wide variety of MDT members, hence enabling the inclusive guidelines to be created. The draft of the guidelines was reviewed by intensive input and feedback from a variety of groups. It was claimed that the contents of the guidelines covered multiple carrier groups and reached a best practice standard for palliative care.

In summary, these five studies used a variety of Delphi techniques to develop different clinical guidelines. All five studies required their panels of experts to refine their knowledge and experience in developing guidelines. Although developing guidelines, based on expert opinions, is a good method, knowledge and data from experts may be biased because of their background knowledge and areas of interesting area. The

process of developing guidelines should start with a review of relevant literature in order to increase reliability of recommendations related to guideline formation. It was argued that developing guidelines, without including a literature review, may encourage findings to be biased (Thomas et al. 1998). Likewise, the study by Rolley et al. (2010), started with a review of relevant literature and interviews of experts in the appropriate field (Barker and Burns 2001), Linde et al. (2005) began with a literature review as a base for developing draft guidelines.

As can be seen from the literature review above, the Delphi technique was used to develop medical guidelines for a variety of purpose as follows including: i) to find the consensus in a new guideline, ii) to make agreement in revised guidelines or to develop the new set of guidelines, iii) to find agreement of key components in health care quality, and iv) to indicate the appropriate intervention or investigation or treatment to deal with a particular issue. In this current study, the Delphi technique was used by the researcher to define key aspects of foot care in diabetes patients, in particular, as well as investigating the appropriate prevention of foot problems in diabetic patients with a view to developing relevant foot care guidelines.

In Thailand, foot examination of diabetes patients was screened by health care providers especially nurses. Clinical practice guidelines for diabetic patients in Thailand have existed from 2007, developed by a group of medical doctors but have not been published These guidelines explained how to carry out treatment for diabetic patients, how to refer diabetic patients with complications and the criteria for referring diabetic patients ,but not specific in foot examination.

10.6 The Panel expert in the Delphi technique

A fundamental principle of the Delphi technique is that the respondents/participants must form a structured group of individuals (described as a collective intelligence), regarded as experts in the field under investigation. The panel of experts or expert panel is a key success factor in the Delphi technique, enabling consensus to be reached. The Delphi technique is used to capture the collective experience and knowledge of a panel of experts in the same field in order to improve decision making and reach agreement or

prediction regarding a particular object. The panel comprises of people who have knowledge or interest in the same area. In order to gain effective and rich data from the consensus, the formation of a panel is the first stage of the Delphi technique (Green et al. 1999, Mead and Mosely 2001a). The level of expertise of the respondents concerning the subject in question is therefore fundamental to the technique.

The following sections will define expert and discuss details: 1) the definition of expert, 2) expert qualification, 3) selection of the panel and 4) the sampling size.

10.6.1 Definition of Expert

The word ‘expert’ comes from the Latin adjective expertus, the past participle of the verb experior, which means ‘to try’ or ‘to experiment’. Hence, expertus literally meant ‘to have tried’ or ‘to have experienced’.

The Shorter Oxford English Dictionary indicates that the use of ‘expert’ to mean ‘experienced’ is now obsolete. Instead, the adjective ‘expert’ now means ‘trained by practice’ or ‘skilled’; and the noun ‘expert’ carries the additional meaning of a professional whose special knowledge causes him or her to be ‘an authority’ or ‘a specialist’.

Several authors (Kennedy 2004, Eraut 1995) have attempted to define expert and expertise. According to Eraut (1995), in his critique of expertise, defines ‘expertise’ as ‘expert opinion or knowledge’ or ‘the quality or state of being an expert’. Dreyfus and Dreyfus (1986) developed a five-stage typology. They, when considering the issue of expert level behaviour, suggested four characteristics: 1) no longer relies on rules, guidelines or maxims; 2) intuitive grasp of situations based on deep tacit understanding; 3) analytic approaches used only in novel situations or when problems occur and 4) vision of what is possible.

An analysis of the definitions suggests that the term expert applies to professionals (doctors, nurses, physiotherapists) who apply familiar solutions using a rule based approach that avoids time consuming deliberations to well defined problems such as

diabetic foot problems and applies critical analysis to manage ill- defined problems of diabetic complications.

10.6.2 Expert Qualifications

Selecting an appropriate panel for the Delphi technique requires the consideration and judgement of researchers (Hsu and Sandford 2007). Researchers require that the principal investigator should examine and consider the qualifications of Delphi panel members. The principal investigator should identify suitable qualifications and select the appropriate participants (Jones and Twiss 1978). Therefore, the identification of experts is actually the first process in the Delphi technique. Baker et al. (2006) stated that identification of experts and selection of appropriate person should be made through a nomination process. Ludwig (1997) recommended that finding the experts should consist of asking for information of nominees from well-known and respected individuals (specialists) from the members within the target group.

There are many criteria for verifying what qualifies one to be an expert. In general, choosing participants who occupy leadership positions, authors of peer reviewed work and individuals having first-hand experience/knowledge of particular issues generally yield satisfactory results. This view is supported by Mead and Mosely (2001a) who stated that experts could be defined by their positions in a hierarchy, as that position indicates public acknowledgement or recommendation. Chang et al. (2010) included nurse among the senior directors, managers, clinicians, educators, and advanced practitioners, represented in rural, remote and metropolitan areas to indicate and respond to agreement about an advanced practitioner tool. The authors reasoned that these experts had knowledge because of their position within the parameter of professional nursing practice and the health service workforce. Peters et al. (2001) drew up criteria for judging experts, including experience of running a diabetic clinic for at least two years, having responsibility in the diabetic management, being interested in the management of diabetes, and the requirement of possessing a diabetic management qualification. They reasoned that such criteria are necessary to explore the perceptions of current practice and future roles of diabetic nurses. While, Rolleys et al. (2010) selected “experts” from among those working in policy, practice and research, as well

as a health consumer to find agreement in the drafting of guidelines for nursing care of percutaneous coronary intervention. They chose to develop the guideline suggested by the experts who know well the problems of the system and nursing care in the population group.

Knowledge is one of the characteristics of qualifications relevant to the classification of 'experts' in the Delphi technique. Knowledge, in this sense, could be highlighted in different ways such as registration with a professional body or a professional qualification in specialised areas/fields. When defining the term 'experts', Keeney et al. (2001, p 196) partly included "knowledge about special issues." Similarly, Hsu and Sandford (2007) stated that participants in the Delphi technique panel of experts should be highly competent in specialised areas related to the issue under consideration.

The criteria of the authorship of material work such as a book or published paper for qualifying as an expert is popular among researchers. From the literature review, Chang et al. (2010) chose the participants in a hierarchy of work positions and also based potential membership on published work. It is argued by Baker et al. (2006) that books and peer reviewed articles may demonstrate areas of knowledge. Similarly, Duncan et al. (2004) used the criteria of research to select the expert panel. In addition, Graham et al. (2005) used the criteria of published papers, having at least one paper in a peer reviewed medical journal in the last three years.

Experience is often cited to justify an individual being perceived as experts. The expertise is related to qualification of professional practice (Baker et al. 2006) and the period of time worked within an area or industry (Baker et al. 2006). These researchers argued that a number of years of experience in the field are necessary to be confirmed as an expert. Jirwe et al. (2009) and Irvine (2005) selected experts who were in senior positions and had knowledge of the issues under investigation. Chang et al. (2010) also considered professionals, based on their published work, when searching for experts. Peters et al. (2001) selected the appropriate expert on the principle of specialist diabetes inclusion. In the field of guideline development, five studies (Rolley et al. 2010, Ostaszkiewicz et al. 2008, Morita et al. 2005, Barker and Burns 2001, and Linde et al.

2005) assumed that the most appropriate experts are those who are directly involved in current practice and are in senior positions.

In summary, from all above the mentioned literature sources, the criteria for selecting the Delphi technique's expert panel includes the knowledge of the professional, experience of work, hierarchy or position and work or papers published.

10.6.3 Sampling for panel selection

Selecting the panel involves non random sampling. Criteria sampling or purposive sampling has been used (Burns and Grove 2005). Polit and Beck (2004, p.729) mentioned that 'selecting participants based on personal judgement about which ones will be more representative or informative…' was an effective approach to selection of panel members. Most Delphi technique studies (in Appendix 1.11) use purposive sampling with criteria for judging expert including those who have special knowledge of the area and special experience (Jirwe et al. 2009, Irvine 2005, and Chang et al. 2010). Only one of the studies used a random sample (Wilson et al. 2010). The study of Peters and colleagues (2001) chose two groups of practice nurses and specialist diabetes nurses to explore the nurses' perception of current practice and future nurses' roles in diabetic management. They used the selection of a random stratified sample of 160 practice nurses from 600 nurses who were contacted because of their levels of expertise and interested in the study.

There are very few expert professionals with expertise in diabetes foot care in Thailand. Hence, it can be argued that purposive sampling is the best sampling strategy in order to gain a multi-professional consensus on developing a set of contemporary foot care guidelines.

If a guideline is to be adopted in different settings, it is important that experts from the different settings are represented in the panel. All empirical studies employed the experts from the different settings. For example, Irvine (2005) selected 72 experts of primary health care sitting throughout Wales, the sample consisting of general

practitioners, practice nurses, district nurses, a community nurse manager, a community practice teacher, district nursing students and lecturers in the area of district nursing.

In summary, it is important to ensure that the panel is composed of experts who have knowledge, experience, and relevant professional practice.

10.6.4 Sample size

The number of experts depends on the amount of specialists in areas and the consensus requirement (Bruce et al. 2008). There is also the issue of whether samples should be homogenous or heterogeneous; should the panel membership consist of individuals from one relatively narrow field of interest or should be a mixed group of experts. Another line of thought on sample size, when considering expert panel membership, relates to choosing heterogeneous or homogenous groups. Mead and Mosely (2001a) claimed that choosing the heterogeneous approach resulted in greater validity of the findings. It is proposed that the heterogeneity of a sample is a requirement to select those from diverse settings and with differences in terms of demography, background or function (Mead and Mosely 2001a, Powell 2003). However, Keeney et al. (2001) mentioned that the number of experts in any one sample and degree of heterogeneity rest on the purpose of the project and planned duration of data collection. A homogenous sample is made up of experts from the same field of interest who have similar backgrounds, so reducing the sample size available (Duncan et al. 2004) because of a narrow definition of expert (Baker et al. 2006). Goodman (1987) stated that the homogenous group is good for cases where the main objective is to forecast or to consider a specialist or highly technical areas. Keeney et al. (2011) suggested that a homogeneous sample is better suited to a small group of panel members. Vernon (2009) stated that selecting the heterogeneous group of experts would be advantageous where the objective of the Delphi approach is to consider boarder policy, aiming to achieve a wider understanding of the area in the question. In the UK, advocates of multi-professional approaches to practice (DH Guidelines, Diabetes UK 2004) argue that several professions and/or specialties within professions have expertise relevant to patients with complex, multiple conditions, and such cases take up an increasing

proportion of the professional time provided by health and social care services, as the population grows older. Hence, the most capable healthcare teams will need members from several different professions, who have acquired experience in recognizing each other's expertise and working together with, and in the interests of, their patients.

Selecting experts from many areas is instructive. It has been suggested that the minimum of number of experts in a panel should be between 7-15 (Linstone and Turoff 2002, Linstone 1978, Donohoe and Needham 2009). It is claimed that accuracy of the data and consensus degenerates with small groups and improves with larger groups (Linstone 1978). Nevertheless, it is recommended that the sample size of the panel in validation studies is between 5-10 experts (Burn and Grove 2005, p400). Bruce et al. (2008) advocates a requirement of consensus at 100 % when the number of experts is limited at a minimum of three.

All the empirical studies located by this researcher employed experts from the different setting in the pursuit of exploring new knowledge, skills or competencies. The number varies widely from 24 to 166 (Jirwe et al. 2009, Irvine 2005, Chang et al. 2010 and Peters et al. 2001). It is noteworthy that all researchers were selected from the heterogeneous group of experts. It is claimed that the panel size depended on the purpose of the study (Keeney et al. 2001) and the researchers' decisions relative to the aim of the study. For example, for the purpose of establishing the level of competency in nurses, Irvine (2005) selected 72 experts from primary health care settings. The decision was based on the assertion in the literature that nurse managers, lecturers and teachers were experts and that primary health care settings were both involved in and important for the role of health promotion.

Other studies concerned with developing guidelines in nursing and health care used panel with membership numbering from 12 to 41 (Rolley et al. 2010, Barker and Burns 2001, Morita et al. 2008, Ostaszkiewicz et al. 2008 and Linde et al. 2005).Furthermore, the group of experts involved in developing guidelines was multidisciplinary in nature. Selecting this kind of group, the number of experts varies although the aim for both types of groups is similar in their wish to construct new knowledge.

In summary, according to the aim of a particular study, researchers should identify the qualifications of experts as a first priority. Purposive sampling was used in this current study and a heterogeneous group was adopted because foot care management involves and requires the collaboration of a MDT comprising nurses, doctors, and physiotherapists.

10.7 The Delphi process

The Delphi technique is a structured process that comprises several rounds of data collection. This method employs a series of questionnaires to gain information from a panel of experts (Keeney 2009). The administration of such a process is a key to the success of the Delphi technique (Keeney 2009). Researchers should design and identify the characteristics of data collection for each round, the measurement of the questionnaires, the response rate, the degree of consensus, and result of the analysis. The following sections will be defined and discussed: the Delphi round, consensus, and the Delphi result analysis.

10.7.1 The Delphi Round

The data collection of the Delphi technique is an iterative process which involves many sequential rounds of survey administration (Yousuf 2007). This process usually comprises questionnaires, surveys and, depending on the objective, may also include interviews. This process is often referred to as the Delphi rounds. The panel of experts is required to comment on questionnaires in as many rounds as appropriate. Each round is followed by a feedback process (known as iterations) wherein a summary of the overall responses from the survey is relayed to the respondents, along with their responses, with a view to encouraging a revision (where necessary) of answers that will finally merge to yield one that is generally accepted or becomes more common among all respondents. This process takes place between the panel and a researcher or researchers, as can be inferred from the many examples of papers with multiple authorship, so as to structure or capture the opinion and knowledge of participants. The process is conducted continuously until a consensus is reached (Hsu and Sandford 2007).

The questionnaire in the first round will seek to elicit a response relating to a broad subject area. The nature of the first round of the Delphi technique is usually unstructured and participants are expected to give responses to clarify the issues of particular purpose, to generate ideas and to ask opinions involving experience, judgement, prediction, and recommendation (Powell 2003). The styles chosen to develop the first questionnaire will depend upon the type of Delphi and the aim of the research. The classical Delphi technique approach starts with an open qualitative round and employing open-ended questions. These first approaches need the experts to clarify responses relating to knowledge or opinion with words, phrases, sentences, and paragraphs. The study by Irvine (2005) used the two open questionnaires to explore the issue of district nurses' competency. Peters et al. (2001) and Wilson et al. (2010) used an open-ended questionnaire and closed set questionnaires to generate qualitative feedback, which was used in the next round. The first round study of Barker and Burns (2001) involved an unstructured questionnaire and asked for opinions about the need for physiotherapy, the frequency of treatment and objectives that were important for treatment guideline. In the four studies as mentioned above (Peters et al. 2001, Wilson et al. 2010, Barker and Burns 2001, and Irvine 2005), qualitative data were obtained and become made the basis for a closed-end questionnaire in the next round.

McKenna (1994) and Boulkedid et al (2011) suggested that face to face interviews increase the return rate of questionnaires in the second round of the Delphi technique. Following a literature review, a number of options are available. A modified Delphi technique may use a first round questionnaire (Rolley et al. 2010, Peters et al. 2001, Morita et al. 2005,Chang et al. 2010, Jirwe et al. 2009 and Irvine 2005), or a survey (Linde et al. 2005). For example in Jirwe's (2009) study, the views of nurses in the first round were gathered by using semi structured interviews to identify specialist knowledge, skills and attitudes and such views were then analysed to build statements. Morita and her colleagues (2005) structured the questionnaire from the evidence gained from a literature review of palliative sedation therapy. Moreover, the study of Linde and colleagues (2005) combined a systemic literature review, interviews and a survey to develop first round questionnaires in order to produce a national clinical guideline for prescription of lower limb prostheses.

Using the literature as the basis for interviews or a focus group is one choice when developing the first questionnaire for use with in the modified Delphi technique. Linstone (1978) claimed that most first round questionnaires were developed via literature searches, rather than a qualitative method or secondary data. It is argued by Keeney (2009) that too much emphasis on retrieving literature reviews as the basic source of information for the first round, can lead to premature rejection of ideas or can result in a biased result (Keeney et al. 2006, Keeney 2009). For example, Rolley et al. (2010) used a literature review as the first step, based on a face to face conference to develop the first questionnaire. They designed the consensus conference in order to give an opportunity to raise the updated issues, hence avoiding any premature closure of ideas. It is arguable that the participants involved in the Delphi technique are under psychologically pressure to express a view. If this were so the data gathered could be biased, open to influence from a wide range of personal and contextual variables (Keeney et al. 2006, Keeney 2009).

In summary, first round questions can begin with open ended questions or closed questions. Powell (2003) suggested that using open ended questions provides and ensures the richness of the data collected. Meanwhile, the second round approach to the questionnaire is likely to be based on interview, review of relevant literature or focus groups.

Subsequent questionnaires are then developed from the returns gained from the initial questionnaires (Keeney et al. 2006). The second questionnaires are sent to the participants along with the summarised data from the first round in order to share the details of all participants' comments. The participants were asked to rate or rank-order (Hsu and Sandford 2007) and to review the item. In the subsequent round, participants get the chance to rethink and reconsider their decisions for each of the previous questionnaire/surveys (Keeney et al. 2006) and return their responses to a researcher. This cycle of rounds will continue until a point of diminishing return has been achieved (McKenna 1994, Keeney et al. 2006) or no new information is forthcoming (Kalaian and Kasim 2012). In the studies conducted by Linde et al. (2005), Peters et al. (2001), and Lofmark, and Thorell-Ekstrand (2004), consensus was reached after the second round, although another study was conducted. They showed the reasons for conducting

the next round and gave the details of consensus levels. Therefore, the details of the second round process should explain the details of consensus and report the analysis of the results.

The third round, should it be employed is usually a revised closed ended questionnaire which is constructed from the summary of finding of the second round questionnaires. This round allows the same group of participants to revise their judgments and give the informants input to comment on their own ideas. From reviewing the literature, the study of Irvine (2005) used the third round to assign a score to each item of competencies gathered from participants. Where consensus is not reached the Delphi process continues, to gradually work towards synthesis. According to Ludwig (1997), Custer et al. (1999), three iterations are often sufficient to collect the needed information in order to reach the required consensus. The general idea therefore is to get the various experts to converge towards the “correct” answer, which is determined as a mean or median score.

10.7.2 The number of rounds

The number of rounds in the Delphi technique can vary depending on, the aim of the study, the available time (Powell 2003, Keeney et al. 2006) and the time needed to acquire a consensus regarding the topic. Grundy and Ghazi (2009) suggested that the number of rounds in the classic Delphi is four rounds; while McKenna (1994) stated researchers using the classical Delphi technique might only need or choose two to three rounds. Moreover, Powell (2003) stated that the number of rounds employed in the Delphi technique is possibly more than three rounds, which will depend on such variables as cost, time and possible participants. Of the 12 empirical studies reviewed (Appendix 1.12) the number of rounds reported ranged from two to four rounds. Jirwe et al. (2009) took four rounds before consensus was achieved; Barker and Burns (2001), Chang et al. (2010), Irvine (2005), Morita et al. (2005), Ostazkiewicz et al.(2008),Wilson et al. (2010) needed three rounds. Rolley et al.(2010), Linde et al. (2005), Peters et al. (2001), Efstathiou et al. (2007), Lofmark and Thorell-Ekstrand

(2004) also found that three iterated rounds in a Delphi survey were effective in achieving a consensus among their panel of experts.

Ostaszkiewicz et al. (2008) employed three rounds of the Delphi technique to gain information and comments on drafts of guidelines for nursing assessment and management of urinary retention. The main objective of the guidelines is to assist problem solving, planning, and decision making. The study by Barker and Burns (2001) and Morita et al. (2005) used three rounds of the Delphi process and mailed questionnaires to refine and elicit the opinions of experts. It seems that all studies relating to of guideline development used two or three rounds when employing the Delphi-based data gathering technique.

Rolley et al. (2010) used two rounds with the aim to develop guidelines to seek agreement, give feedback and reword recommendations about existing evidence, and Linde et al. (2005) used two internet rounds to rate proposed clinical guidelines, while Peters et al. (2001) used two postal rounds to gather information and opinions about nurses' role.

In summary, it appears that there is no generally accepted guidance as to the optimal number of rounds needed when employing the Delphi research model; as such research is so often limited by being situation centric. Researchers varied in the number of rounds used, depending on the consensus that they were aiming to reach, confirming the situation specific nature of such research.

10.7.3 Controlled Feedback

The Delphi technique makes use of geographic dispersion, and distance communication (e.g. postal and electronic mail) to control manipulation or exchange of information. The identity of the Delphi respondents is usually not revealed; they remain anonymous. This offsets shortcomings such as influence from dominant participants, personal biases, the bandwagon effect etc., which are common in group interactions. The process of the Delphi technique has been used in various disciplines and areas of concern including

assessment of policy, needs assessment, resource utilisation to develop a full range of alternatives, program planning and to explore underlying assumptions.

10.8 The measurement of the questionnaire

There are many different approaches to recording responses to questionnaires; however, the Likert scale is the most common method used. Keeney et al. (2006) claimed that the Likert scale is a perfect scale to obtain agreement with the Delphi technique. The aim of using Likert scales is to facilitate the participants coming to an agreement level based on measured statements. All studies cited in this literature review used Likert scales ranging from a 2-point binary scale (Linde et al. 2005) to a 10-point range (Rolley et al. 2010). The five point scale is the most commonly used in the questionnaires to rate the agreement (Peters et al. 2001, Lofmark and Thorell-Ekstrand 2004, Irvine 2005, Chang et al. 2010). No studies mentioned or justified why their authors chose to employ the Likert scale.

Seven point Likert scales were used for the research by Jirwe et al. (2009) and Wilson et al. (2010) to assess the strength of responses to questionnaires There is evidence of problems when using a seven points of Likert scale (McIlfatrick and Keeney 2003).

In summary, there is evidence of a variety of Likert scale grading used in the research studies cited in this literature, choices that were arguably based on considerations relating to the purpose of questionnaires and the study.

10.9 The consensus and response rate

Consensus is the aim of the Delphi technique. Consensus shows the degree of agreement of the participants to each statement. There are many ways of evaluating levels of consensus obtained by using the Delphi technique such as percentage, mean and standard deviation, and median. The idea of consensus is increasingly being used in the areas of health and nursing, although no guidelines show how to judge when a consensus, other than total, is achieved and which level is suitable for one, if 100% agreement is deemed unlikely or unrealistic.

10.10 The advantages and disadvantages of the Delphi technique

The Delphi technique in essence consists of a series of questionnaires, interspersed by feedback, which seeks to gain the most reliable consensus of opinions from a group of experts. This technique is useful where the judgements of experts are sought in order to reach agreement on controversial subjects. The increasing use of the Delphi technique in health care has been reported by Boulkedid et al. (2011) as this method uses the clinical evidence and the thorough knowledge of clinical experts including a range of opinions, systemic reviews, clinical trials and clinical analysis (Jaeschke et al. 2009).

11. Summary

While the critical review of the literature revealed much research into various elements of diabetic foot management, there is a gap in the area of assessment tools for preventing diabetic foot problems and utilising the practice assessment tool including practice guideline

Although there are international guidelines on the management of the diabetic foot (NICE 2004, IWGDF 2007), these appear to reflect the management of patients in developed countries rather than in developing countries. There are assessment tools for assessing the foot such as the PEDIS as recommended by the IWGDF (2007). However, they all have limitations and currently there is no agreement on the use of a particular assessment tool in developing countries.

The complications of diabetes can be reduced by using risk assessment to identify those at risk and to offer appropriate intervention in the forms of foot care and education. Foot care management of diabetic patients is well reported and guidelines fully developed, yet these tools are still not available in Thailand and hence the need to develop a foot care guidelines designed for and responsive to the needs of Thai people.

The Delphi technique was adopted as the research method and was widely utilised in investigations into nursing and health care. The utilisation of the Delphi technique in developing practice guidelines was well reported. Reviewing the utilisation of the Delphi technique revealed that many studies were conducted for many different

purposes, such as finding key components, and developing practice guidelines, with no standard method or commonly agreed method. The feature of the Delphi's technique is the consensus method of gathering expert based information, which is used widely in developing practice guidelines. Developing nursing practice guidelines for diabetic foot care is the main aim of this study, as no published studies have been located on this theme in Thailand.

Table 2.3. Risk Classification System for diabetic foot complication

The International Working Group on the Diabetic foot (IWGDF;2,7)[1]			Risk Classification System (NICE 2004)[2]		
Category	**Risk profile**	**Check-up Frequency**	**Classify foot risk**	**Risk profile**	**Check up**
0	-No unnoticed pinprick with the Semmes-Weinstein monofilament and/or -Vibration perception threshold less than 25 Volts	Once a year	Lower current risk	-Normal sensation, -palpable pulses	Arrange recall and annual review
1	-One or more unnoticed pinpricks with in primary care or health care centre diabetic patients received and/or Vibration perception threshold more than 25 Volts -Ankle – brachial index more than 0.8 and all pedal pulsations palpable -No hallux valgus, rigid toe contractures (such as hammer-or claw toes)or prominent metatarsal heads	Once every 6 month	At increased risk	-Neuropathy or absent pulse or other risk	Review 3-6 monthly
2	-One or more unnoticed pinpricks with In primary care or health care centre diabetic patients received and/or Vibration perception threshold more than 25 Volts -Ankle – brachial index lesser than 0.8 and all pedal pulsations palpable or -Hallux valgus, rigid toe contractures (such as hammer-or claw toes)or prominent metatarsal heads	Once every 3 months	At high risk	-Neuropathy or absent pulse -Deformity or skin changes or previous ulcer	Review 1-3 monthly
3	Previous ulcer or amputation	Once every 1-3 months	Ulcerated foot	-Foot care emergency and foot ulcer	Review 1-3 monthly after healing

Source from: 1 Armstrong and Lavery (2005:33), 2 NICE (2004: 7)

Chapter Three: Theoretical Background

1. Introduction

This chapter critically explores self-efficacy and risk theories and their application in health care as both are essential to empower patients to take responsibility for their own health and making health care managers assume responsibility for the management of risks that are preventable. The theoretical frameworks are necessary to create a guideline in which the prevention and management of diabetic foot care becomes part of an overall management activity.

2. Self-efficacy

The self-efficacy concept refers to the belief that people have their own ability to succeed or achieve what they want to achieve (Bandura 1977a). Self-efficacy is based on social learning theory as proposed by Bandura (1977a). In the self-efficacy's model, an individual plays a major role on approaching his/her goal by using his/her task and challenges (Bandura 1977a). Based on their perception of self-efficacy, an individual will establish the behaviour or activity, the expanded effort, and the persistent degree of effort required to achieve their goal (Bandura 1977b).

Self-efficacy or belief is formed in early childhood and developed continuously throughout life by successful events, vicarious experiences, social persuasion and stress reaction releases (Bandura 1994). The process of efficacy activation can be developed by four methods: cognitive process, motivational process, affective process and selection process (Bandura 1994, Hurley and Shea 1992, Krichbaum et al. 2003).

2.1 Self-efficacy with diabetics

Self-efficacy has been used as a framework to explore and change a patient's behaviour in chronic illness. Self-efficacy was related with self-management and Clark and Dodge

(1999) explored that self-efficacy for predicting disease management of patients with heart disease.

In diabetes, self-efficacy had been proposed as a framework to structure patients' belief in the self-management of their own illness and to develop behaviours or self-care management strategies (Hurley and Shea 1992, Sarkar et al. 2006) and predict the achievement of care (Clark and Dodge 1999, Sarkar et al. 2006). Clark and Dodge (1999) and Hurley and Shea (1992) suggest that increased self-efficacy results in more self-management. Moreover, Williams and Bond (2002) stated that self-efficacy is important in self-behaviours of diabetes in issues of diet, exercise and blood glucose testing.

Diabetic patients need to change the behaviour in order to control glycaemia and prevent complication. The self-efficacy concept offers a challenging approach to address individual beliefs and to predict the management of the disease in order to effect a behaviour change.

Diabetes causes many complications in long the long term and most of these have been associated with hyperglycaemia (UKPDS 1990). Thus, promoting glycaemia control will involve a change in behaviour in relation of exercise, diet, medication. This concept will be explored further in the discussion chapter as a tool for self-management of diabetes.

3. Risk definition

A risk can be defined as the chance of a particular event occurring and the adverse impact that it would have. Sayers et al. (2002) suggested that risks have two dimensions; the first is the probability of the event occurring which has not yet happened and which may not occur, and the second relates to the impact if the event were to occur. The probability of diabetic patients developing foot ulcers in Thailand can range anywhere from just above 9.6 % (Aekplakorn et al. 2007) to just below 100%. If the probability of a foot ulcer developing is exactly 100% then it would be a certainty and not a risk. Alternatively, if patients do not develop foot ulcers, then it would not be considered a risk. When the probability of a negative event is quantified

using scientific methods, the measure becomes known as the objective risk. The risk of a foot ulcer by its very nature always has a negative impact. However, the size of the impact varies in terms of financial cost and impact on quality of life and social status.

4. Introduction to risk management

As mentioned in Chapter 1, foot ulcer prevention is of major concern worldwide, especially for diabetic patients, due to the increasing number of amputations that are carried out as a result of inadequate foot care. Boren et al. (2007) has shown that complications of diabetes can be prevented by effective risk reduction. However, risk reduction cannot be achieved unless there is a multidisciplinary strategic approach in the management of diabetic foot ulcers.

Diabetic foot complications can be prevented or slowed by controlling risk, especially regarding hyperglycaemia. There is strong evidence from UKPDS (Adler et al. 2002) and DCCT (1993) studies that managing hyperglycaemia will reduce microvascular complications and, to a lesser extent, macrovascular complications. Managing the risk of developing foot ulcers would therefore result in improvements in quality of life. Gamble and Aires (1994) support the importance of using risk management through staff working together to improve patient care.

5. Risk management theory

The literature describes several theories which are useful in understanding risks and risk perception, which are central to risk assessment, and risk management and decision-making. There are four major social approaches to risk: Cultural Theory, Risk Society Model, Psychometric Approach and Social Judgment Theory.

5.1 Cultural theory

Cultural Theory is a sociological approach to risk perception and was developed by Douglas and Wildavsky (1982). Cultural Theory argues that all risks are socially constructed, and identifying risk requires the configuration of ideas about what

outcomes would be undesirable and what conditions put us in danger of experiencing those outcomes (Douglas and Wildavsky 1982). The theorists assume that risks pose a threat not only to an individual's wellbeing, but also to the prevailing social order (Casiday 2007, Thompson et al. 1999). Although this theory is helpful in understanding the social construct of risk, Casiday (2007) argued that it lacked empirical support and sound rationale of different beliefs and concerns affecting the relationship between risk and human judgments. The management of patients with diabetic foot ulcers within a health care community can be framed within such a social construct, although it may not provide an understanding about how practitioners judge patients at risk of developing foot complications, nor helps to improve practitioners' decision-making abilities to manage diabetic foot ulcers.

The Risk Society is predominantly concerned with manufactured risks. Beck (2002) suggested that in the pre-modern society, risks were associated with natural disasters. However, in the contemporary world, risk has emerged as a consequence of human activity in the pursuit of industrial development. Giddens (1999) and Beck (2002) argued that it is possible for societies to assess the level of risk that is being produced and implement interventions that are necessary to mitigate such risks. For example, technological developments in health care are increasing longevity and, in diabetes, complications tend to develop over time. It can be argued that this model offers an alternative way of understanding risks and developing effective strategies to prevent adverse event or reduce the risk.

Thus, health care practitioners can develop interventions such as foot care practices that would prevent or delay the emergence of foot complications. Critics of this model, such as Casiday (2007), argue that this model is of limited general usage across cultures and may, in fact, only apply to a very particular section of modern industrial society where good foot care practices have been developed and resourced.

The Psychometric Approach (PA) focuses on how people perceive risk and the way in which different factors influence their perceptions. Slovic (2000) suggested that people use a number of heuristics to evaluate information. Patients' and health care professionals' perceptions of risk may be influenced by different factors and how they

evaluate that information. It is important to clarify how patients view the risk of developing foot ulcers so that effective prevention strategies, which will have the support of patients using them, can be put in place.

Social Judgment Theory (SJT) critically examines the relationship between risk, risk assessment and how information can affect judgments and decision-making. SJT is built on the early work of the psychologist Egon Brunswik, who founded the principles of probalistic functionalism. The core of SJT is the Lens Model (Rand 1967, Louis 1983, Picart 1990, Thompson and Dowding 2002), which proposes that human judgment relies upon probabilistic information in making judgments about some relevant part of an uncertain environment. The SJT assumes that people make judgments from information that is probably relevant to the judgment objective, based on predictive validity, and can be organised and patterned in different ways (Picart 1990). The proposed foot care guidelines being developed in this research include several stages of assessment of the foot. Following assessment, the diabetic foot can be categorised as follows: at low risk, increased risk, high risk or an emergency (NICE 2004).

6. Summary

The key paradigm to emerge from the discussions in this chapter is that the self-efficacy model can be used as a possible framework for developing self-management in patients. Patients should be supported to change their life style in order to prevent or delay the complications of diabetes. Furthermore, organisations have an important role in developing and implementing strategies to ensure that there is an effective risk management strategy for ensuring that good practice changes are implemented. Several theories of risk are present in the literature with critical debates on the empirical support and validity for each of them. This chapter has described four of the models with discussions on how each could be applied in clinical practice to manage risk in the health care context in Thailand.

In this research, self-efficacy is chosen to be a framework of promoting self-care in order to prevent foot complication in diabetic patients. It is believed that self-efficacy can predict self-care management, when it is promoted, self-care management will be

improved as a result. Nurses play a key role of foot assessment for preventing further foot complication and promoting self-foot care in patients. Regarding the manual of foot assessment, the level of risk in foot complication due to diabetic should be identified so that an appropriate foot care will be managed. In addition, the social judgement theory is justified to be framework to develop the process of risk assessment including shared decision making between nurses and patients. It is believed that this model explained the relation of risk for foot complication, foot risk assessment including judgement of choosing foot management and foot treatment.

Chapter Four: Methodology

1. Introduction

This chapter presents the methodological framework for the study. It offers justification for the qualitative approach used, discusses the study design, the research settings and the sampling techniques. It further describes the data collection methods, which include semi structured interviews and the Delphi technique. This chapter also describes the analysis process for the data gained through the qualitative study.

2. Qualitative research paradigm

When describing the concept of a research paradigm, the terms quantitative and qualitative research is frequently used. Quantitative research draws on the positivist paradigm and relies on objective measurements. The positivist paradigm, being at one end of the qualitative-quantitative spectrum, believes that a single truth is reached by a scientific method such as statistical tests. Focused at the other end of the spectrum is the constructivist paradigm that argues that there are multiple truths to what is defined as reality. These truths are based on the context of people's varying perspectives, which are formed by their experience and background. Moreover, it is believed that the constructivist paradigm is an interaction between causes and effects; therefore, it is impossible to investigate causal relationships and focus on prediction and control (Holloway and Wheeler 2004). The constructivist paradigm thus forms the basis of qualitative research (Tashakkori and Teddlie 2000), since the form of research encompassed within the interpretative paradigm. Constructivism would refer to and be based upon the belief that 'the knowable world is that of the meaning attributed by individuals' (Pickard and Dixon 2004, para. 2). In contrast to the positivist paradigm, Polit and Beck (2004) suggest that most qualitative approaches aim to provide a rich, contextualised perspective in human experience from rigorous cases. Furthermore, Munhall (1982) suggests that qualitative approaches are congruent with nursing philosophy, which is patient-centred, holistic, and humanistic.

Qualitative description is an approach that conducts closer data finding than other qualitative approaches such as, phenomenology, grounded theory, narrative study, and ethnography (Sandelowski 2000). Sandelowski (2000) considers a qualitative descriptive approach as a 'fundamental' qualitative research design which is appropriate and valuable when direct descriptions of phenomena are required. A qualitative descriptive approach permits a researcher to exemplify facts of selected phenomena in everyday language. This is a position that does not include data adornment such as theorisation and transformation. Moreover, qualitative description employs less interpretive data, rather than extreme and outrageous conduct, when the researcher considers what the data actually describes (Sandelowski 2000).

Qualitative description is recognised as a study of something located in a relatively natural setting such as a hospital. Qualitative description is considered the least 'theoretical' compared to other qualitative approaches, which are always associated with pre-existing theories. However, the research methodology of qualitative description, and other qualitative approaches, is similar in data collection, data sampling of participants, and data analysis. Regarding to interpretive validity, it is claimed (Sandelowski 2000) that the interpretation of selected phenomena by researchers would be considered accurate by participants because of less interpretation. In this context, qualitative description is an appropriate design for researching the perspectives of participants toward foot care practices among nurses, educators and diabetic patients in Thailand.

Qualitative research uses open-ended questions to give participants the opportunity to respond in their own words. Moreover, it emphasizes the exploring and understanding the participants experiences rather than the cause-effect relationships and forcing them to choose from fixes responses (Miles and Huberman 1994). Thus, the outcome of qualitative description contributes to answering the first research question, which is the current and best practice of foot care in Thailand, using semi structured interviews. This exploration of current foot care practice was also utilised as evidence in developing nursing practice guidelines.

In developing practical guidelines, it can be argued that it is imperative to consider practitioners' perspectives on the clinical issues in order to ultimately produce a guideline which will be pragmatic and have the support of the practitioners who will be using them. In analysing the literature, Tan et al. (2009) concluded that qualitative studies have been useful in developing nursing guideline, and such studies have provided evidence in clinical guideline development as used in NICE guideline and associated recommendation. It is stated by Tan et al. (2009) that nearly half of 49 clinical NICE guidelines use qualitative studies for developing clinical recommendation. For example, Ostaszkiewicz et al. (2008) used qualitative literature to develop a draft of guideline, while Barker and Burns (2001) used evidence from of clinical trials, observational studies and expert opinion. Therefore, it is argued that the qualitative studies can provide rich context for developing clinical guidelines which is embedded in current practice based on available clinical data and knowledge of natural setting (Curry et al. 2009). In a large number of clinical guideline development, qualitative research were used as much as quantitative research (Tan et al. 2009).

Curry et al. (2009). Suggested that the outcome of qualitative research provides detailed perspectives of individuals and a comprehensive understanding of a problem's background.

The guideline was developed using a range of activities (LoBiondo-Wood 2013). It is believed that developing a clinical guideline should use systematic and rigorous methods to assure a high quality and consistent guideline (LoBiondo-Wood 2013). One limitation is where there is an insufficient research base. To address this, the expert base method involves supplementing the evidence base with a group of specialists, gathered to give consensus or agreement via Delphi techniques, or others such as consensus conference.

There are many qualitative methods that can be used for developing clinical guideline such as document review, in-depth interview, unstructured methods: experts panels, round tables and structure methods: focus group, consensus conference, the Delphi technique, and nominal group technique (Murphy et al. 1998, Curry et al. 2009, Rolley et al. 2010, Rolls and Elliott 2008), as used by Barker and Burns (2001), Linde et al.

(2005), Morita et al. (2005) and Rolley et al. (2010). For instance, Barker and Buns (2001) in the first step of their study used a critical literature review to develop a draft clinical guideline. The final guideline used a peer review process of clinical experts. However, Linde et al. (2005) used a multimodal approach to developing guidelines, which included interviewing experts, literature review, and questionnaires which makes the research more robust. Meanwhile, Rolley et al. (2010) used the qualitative methods of literature review and expert consensus conference to discuss the limited evidence base of nursing care and develop the draft and using the Delphi technique to elicit the consensus and the draft guideline. Furthermore, Rolls and Elliott (2008) had developed the clinical practice guideline for intensive care with evidence based practice combined with nominal group, Delphi panel and consensus development conference.

In summary, it is important to realise that using expert opinion should be supplemented by incorporating evidence from research and clinical expertise (LoBiondo-Wood 2013). Thus, selecting combination of systemic review, expert base process, the interview and the Delphi technique provided the rigour to the development of a nursing practice guideline, similar to Rolley et al. (2010) and Rolls and Elliott (2008).

The Delphi technique provided the systemic approach, which enhance the decision-making, review criteria for areas where the evidence alone is insufficient, and facilitate the development of quality (Boulkedid et al 2012), specifically in order to gain the clinicians' experience of foot care practice and knowledge in Thailand.

This research used the literature to develop questionnaires which were combined with interview nurses, educators and patients, and the main stakeholder of the guideline. Experts were not interviewed prior to the development of the Delphi statements, to minimise psychologically pressure and hence bias (Keeney et al. 2006, Keeney 2009). Sampling was guided by the MDT in Thailand, consisting of medical doctors, nurses, physiotherapists, and nutritionists. There was a scarcity of podiatrists and equipment for testing via monofilament and insufficient information from referral resources. Therefore, it was necessary to explore the current foot care practice in the context of current diabetic patients and nurses.

3. The rationale for using a qualitative research model

The rationale for selecting this method of collecting data in this study lies within the strength of the philosophy of the qualitative approach. The qualitative paradigm can enhances understanding of the context in which diabetic foot care practices are carried out in health care settings and the perceptions of the nurses, educators, and patients.

Firstly, diabetic foot care is a new chapter in nursing roles in Thailand. For instance, the findings of the qualitative study explained how Thai nurses examined their patients, and provided them with diabetic foot care education. Nevertheless, this data might not generalise to diabetic nurses or nurse educators around Thailand. According to the qualitative approach, the study provided a comprehensive knowledge and understanding of diabetic foot care undertaken by Thai practical nurses and nurse educators.

Secondly, the scope of the study was expanded in another perspective involving diabetic foot care practices. This primary study aimed to explore the current practices of Thai nurses and nurse educators in relation to diabetic foot care. Nevertheless, this study was directed towards the perceptions of stakeholders. Perspectives of stakeholders were examined in order to describe, in general terms, the 'facts' of diabetic foot care in Thailand. Therefore, the qualitative study was conducted to explore knowledge of diabetic foot care and self-foot care of their feet by patients in Thailand. For instance, the finding of the qualitative study explained how diabetic patients practised self-foot care and diabetic patients' knowledge of diabetic foot care.

Lastly, the qualitative approach was conducted for the purpose of development, relative to the meanings participant's nurses, educators and diabetic patients gave to core components of foot care management. This fundamental description of the phenomena was further used to develop self-efficacy and risk management in diabetic patients in Thailand. It is unknown what items were to be included for consideration; therefore, interviews with nurses, patients and educator were conducted. Consequently, this approach was appropriate for the study and development of Thai diabetic foot care guidelines.

In conclusion, this present study was conducted in two phases with two methods: semi structured interviews and the Delphi technique. Both methods were used separately to provide answers to research questions.

3.1 Method of phase one - Semi structured interviews

The most common form of data collection in qualitative study is the interview, because it is extremely useful for eliciting informants' experiences. Fain (2004) stated that the interview is used in qualitative study to elicit meaningful data. There are many types of interview methods, from the unstructured to the structured interview; from 1:1 to a group. It is believed that the unstructured or semi structured interview is the model generally employed in qualitative studies (Holloway and Wheeler 2004).

There are several reasons why semi structured interview provided reliable data in this study. Firstly, the semi structure interview is utilised to gain in depth information by varying the questioning dependent on the answers being given by the respondents, but at the same time the interviewer remaining focused on the questions at hand. For example, in this study it enabled the researcher to gain information on how diabetic foot care was managed but at the same time allow practitioners to express issues that have hindered practice, or identify factors that may enhance implementation of the practice guideline. Semi structured interviews allow an exploration of deeply held information regarding social and personal issues (DiCicco-Bloom and Crabtree 2006), especially among professionals where authority can be a powerful issue. In this study, semi structured interviews allowed for the exploration of key issues in relation to diabetic foot care management: knowledge and foot care practice of diabetic patients, nurses and educators. Although unstructured interview may elicit the deep knowledge and behaviors, DiCicco-Bloom and Crabtree (2006) suggested that the process is more time consuming and that the interviews as well as the analysis of the raw data could take a long time. The researcher decided not to use the unstructured approach for the interviews due to the limitations of time for undertaking the research and being confident that the semi structured interview format provided the detailed information needed, combined with the shorter duration which was important for busy practitioners. Gale et al. (2008) explored beliefs about diabetic foot complication and every day foot self-care practice of diabetic patients and also used individual in-depth interviews as the

predominant data collection strategy to elicit relationship between belief and foot related behavior in the primary health care setting.

Secondary, semi structure interviews provided the reliability of information involving behaviors. DiCicco-Bloom and Crabtree (2006) recommended that the semi structured interview provide the iterative process of data collection and analysis. This strategy is referred to as an editing approach, because of the reviewing and identifying of text in many rounds. For example, the study of Mackintosh et al. (2013) used semi structured interviews to investigate the reasons why individuals contact, or delayed contacting, emergency medical services for sufferers of stroke. Nineteen stroke victims and 22 witness interviewees with multiple in-depth interviews were selected. This study showed the strength of multiple interviews and a greater number of interviewees. It concluded that semi structured interviews with multiple in depth interview provided rich data along with the study goals.

Thirdly, the interview also elicits in-depth information of observed behaviour, especially when unstructured (DiCicco-Bloom and Crabtree 2006). Nonetheless, the observational behavior could be collected using direct observational research method (Holloway and Wheeler 2010). However, observation methods in qualitative search usually involve engagement over a prolonged amount of time, which would be outside of the resources of this project. In addition, the ethical requirements for signed consent for observations may alter behavior (Kawulich 2005). Hence, this study did not involve an observational technique.

3.1.1 Advantages and disadvantages of semi structured interviews

For the reasons, this research adopted the semi structured approach. This allowed the research to explore current practices for diabetic foot care among practitioners and to use the evidence to develop nursing practice guideline. Diabetic foot care practice should be based on evidence and hence these interviews will be valuable sources of data. The researcher also accepts that the final guideline is not a fait-accompli and that more work will be required in the future. Since the development and production of the

guideline is a dynamic process and likely to change as new knowledge becomes available, there will be opportunities to further enhance the efficiency of the guideline to provide practitioners with a tool to improve the assessment and management of people with diabetic foot issues.

The first phase of this study used semi structured interviews with an interview guide (Appendix 2) for exploring and clarifying what level of education nurses and educators provide, as well as the patients, the nurses and educators' knowledge of foot care, especially related to current practice and problems of diabetic foot care in Thailand. However, the face-to-face interviews might provide inconsistent findings between words and actions (Holloway and Wheeler 2010). To alleviate this problem, interviews with diverse groups of people involved in diabetic foot care were instead interpreted as providing rich data relating to the subject.

The participants in the semi structured interviews were divided into three groups: nurses, educators and patients. The rational for selecting a group of patients was that they should need foot care practice and knowledge from nurses and they could reflect upon their needs relating to diabetic foot care services and how those needs were or were not met. The interview guide was developed through a search of relevant literature (in Chapter 2) for information regarding best practice in foot care for diabetic patients.

Face to face interviews have been a dominant interview technique in the field of qualitative research (Polit and Beck 2008). However, this method has its advantages as well as disadvantages. In a semi structured interview, the researcher has a framework of themes to explore, such as education and the practice of foot care. The organisation of themes or topics in the interview guide allows the researcher to focus on relevant topics and issues without constraining them to a particular format and to tailor the questions to the contexts and the participants being interviewed. For example, in this study, the researcher had to adapt the guide when interviewing participants from rural areas, who had only limited knowledge of diabetes and foot care.

The semi structured interview is also flexible, allowing new questions to be discussed as a result of what the participant says, particularly about such sensitive issues as the *non-wearing of shoes in the house*. Semi structured interviews allow a less intrusive method

to be adopted as the researcher attempts to gather information, thus facilitating a two way communication process providing answers plus reasons for the answers, which are critical components in qualitative paradigms (Holloway and Wheeler 2002).

One of the disadvantages of using this method of collecting data is that the respondent may give answers to what he/she thinks the researcher wants to here, rather than their 'true' response. This potential distortion can be reduced by using an interview protocol and by the awareness of the researcher of this problem. The researcher must also listen very carefully to what is being said, as well as formulating questions to be asked (Polit and Beck 2008).

Semi structured interviews are commonly used in qualitative studies to collect data. A semi structured interview consists of open ended questions that provide the chance to obtain large amounts of data which the detailed response generates. This type of interview meets the required levels of validity and reliability of data (Polit and Beck 2004). The questions in this type interview are fairly flexible and sensitive and the data is easy to analyse. Meanwhile, the disadvantage of a semi structured interview should also be taken into account: a flexible interview would be less consistent than a more structured one. The issue of time, administration and participant availability should be planned for. Furthermore, the limitation of using the interview, as an information gathering technique, is an issue of implication, starting with questions informed by existing guidelines. This semi structured interview as opposed to asking unstructured questions, can introduce bias or not get sufficient depth which may result in a lack of precision and reliability. Likewise, the unstructured interview might limit the inquiry of existing guidelines (Holloway and Wheeler 2004). For instance, unstructured enquiry might not give answers to specific questions regarding the practice of foot care, whereas structured questions might miss important issues that the researcher had not thought of. It is believed that the semi structured interview format was justified in order to collect in-depth information directly relevant to foot care practice. In addition, this semi structured interview helped to justify the use of a sequential exploratory approach Therefore, semi structured interviews will be used in this study because it ensures the answer to the research question but also has the flexibility to explore issues raised by the respondents.

3.2 Method of phase two - Delphi technique

Additionally, the study of developing guidelines in this literature involved both the classical Delphi technique (Barker and Burns 2001 and Linde et al. 2005) and the modified Delphi technique (Rolley et al. 2010, Ostaszkiewicz et al. 2008, and Morita et al. 2005). In this current study, the classical Delphi technique is justified for use to construct the nursing practice guidelines for two reasons. Firstly, the diabetic foot care guidelines are to be developed for practical, rather than academic, purposes; the researcher was employed as an academic nurse in Thailand and is not an expert in diabetic foot care. Besides, diabetic foot care was a new issue for nurses who were employed to examine foot problems in 2005 around Thailand.

The second phase of this classical Delphi technique grew from a literature review of diabetic foot care and interview data, in order to reform the first round questionnaire of diabetic foot care. Secondly, there are developing diabetic foot care guidelines for Thailand. Developing guidelines were extracted mainly from evidence outside Thailand and less from evidence relating to diabetic foot care within Thailand itself.

Consequently, using experts in the classical Delphi technique is appropriate for this study. The panel was composed of experts in Thailand who are familiar with diabetic patients in Thailand. Another reason for using the classical Delphi technique in this study is that there are different management and clinical issues with diabetic foot guidelines in literature, such as the different referral systems and guidelines outside Thailand. For example, according to the literature the referral system of diabetic patients, who had a diabetic foot ulcer, should involve a consultation with a podiatrist. However, there are no podiatrists in Thailand. The referrals and health care of diabetic patients, who are faced with foot ulcers or are at risk of developing foot ulcers, are provided by medical doctors, surgical doctors and physiotherapists.

4. Justification for this research approach

There has been little previous study on the topic in Thailand and the available evidence is not yet in the public domain. This study aims to develop a pioneering set of nursing practice guidelines relating to the prevention and foot care management of diabetic patients. Currently, there is no published work dealing with nursing and this topic in Thailand.

4.1 Rational for choosing an expert panel

The number of qualified experts and selection of experts in this study was an issue decided pragmatically; those identified who had the relevant knowledge and agreed to enter the study. The researcher decided to select a MDT to be participants, because this team deals with diabetic foot care in practice, although the treatment of diabetic foot care is mainly the role and duty of medical doctors in Thailand. Nurses have a role of examining feet in a diabetic foot clinic and providing nursing education for foot care. There are only a few diabetic foot clinics in secondary and tertiary hospitals, in which a foot examination is undertaken by the nurses, followed by confirmation of neuropathic status of the foot by a doctor. The Diabetes UK (2008a) has recommended a MDT approach to the management of diabetic foot care and thus it was important to gain consensus from a multidisciplinary panel managing these patients. Therefore, the selection of the panel of experts in this study was designed to choose a heterogeneous group.

The experts were all sourced from Thailand. Qualifications of experts were initially identified in this research: a doctor or nurse who had worked in a foot care clinic for at least three years or had experience with knowledge in the field of diabetic foot care dating back at least three years. Also included could be any person who had carried out research or who had published a paper involving diabetic foot care in the least three years. In addition, the experts who had worked in a best practice foot care clinic in secondary hospitals and tertiary hospitals were included in this study.

Finding the diabetic foot experts was accomplished by reviewing published academic, practitioner papers from journals and conference proceedings from international databases, the website of the Thai Association of Diabetes Educators 1998 (www.thaide.org), the Thai Nurse Association and the best practice of diabetic foot care clinic of The Ministry of Public Health care services for diabetic foot care in Thailand. Twenty seven panel experts were approached via telephone or face to face contact. Seven experts, when contacted, declined to participate in this research. The expert panel membership was made up of twenty experienced clinicians from tertiary hospitals, secondary hospitals, faculty of medicine, faculty of nursing science, a private hospital, The Thai Leprosy Organisation (Raj Pracha Samasi Institute) and specialists from the best practice foot care clinic across Thailand (Appendix 3). This number was considered as sufficient to produce reliable data and results relative to the aim of this study.

5. Ethical considerations

Ethical concerns relevant to this study were informed consent, voluntary participation, confidentiality, and anonymity. Ethical issues have to be considered in all research studies in order to protect participants from harm and risk and in order to follow professional and legal rules (NMC 2008). Generally, nursing and midwifery ethics are concerned with guiding professionals to 'safeguard the interest and well-being of patients and clients' (NMC 2008). Thus, the researcher has a background, which focuses on the ethical and legal aspects of the profession.

This study consisted of two phases of qualitative research and was approved by De Montfort University, Faculty of Health and Life Sciences Faculty Research Ethics Committee (Appendix 4) and PhraPokkloa Hospital (Appendix 4.2)

The first phase was the semi structured interview. All participants, including patients, nurse specialists, and educators, were invited to give informed consent before interviews and give permission for use of a voice recorder. No participant was identified by name and each was assured of data confidentiality and that they would not be identified by name or in any published manuscripts. Patients also consented to have

photographs of their feet and wounds taken and for selected photographs be reproduced in this thesis (Appendix 5).

The second part of this study was the Delphi technique with the group of experts. No group participants met with any other face to face; therefore, they could present and react to ideas in a neutral way without pressure. They could express their opinions and give comments via the questionnaires in the next round. The Delphi method states that anonymity is an important feature which is different from another consensual method: nominal group technique.

6. Study design

Figure 4.1 shows the research design of this study.

Figure 4.1 Research process

Research philosophy Post-positivism
Phase 1 Interview
Phase 2 development of nursing practice guideline Delphi technique
Data analysis -Phase 1- Content analysis -Phase 2 Percentage

Due to the research aim, this thesis is different from Rolley et al.'s (2010) study that focused on 'developing nursing guidelines' this current research is not only evaluating the practical aspects of diabetic foot care but also developing the nursing practice guidelines for foot care of diabetic patients in Thailand.

This thesis provided the attributes of diabetic foot care in Thailand. Therefore, it used a descriptive qualitative design to determine the problem and current practices of diabetic foot care, from the participants' perspective of diabetic patients, nurses and educators.

The current study process was conducted in two phases. In phase one the research process was qualitative and consisted of semi structured interviews. Five nurse practitioners, five nurse educators and fifteen patients with diabetes were interviewed

from January to May 2009 with the aim of exploring current practice in foot care. Following analysis of the data and the current literature review, a questionnaire was developed which formed the basis for phase two of the research process.

In phase two the research used the Delphi technique to develop the nursing practice guidelines for foot care in patients with diabetes, and was conducted between June 2009 and May 2010.

6.1 Phase one, semi structured interview

6.1.1 Setting for semi structured interviews

Semi structured interviews were conducted at Prapokklao Hospital in January 2009. This hospital is the central university hospital, in which tertiary care is provided in Chantaburi Province, eastern Thailand (as illustrated in Figure 4.3). Comprehensive services in various specialty areas, including a diabetic clinic, are offered at this hospital. Diabetic patients are cared for at both inpatient and outpatient departments.

At the outpatient department, the diabetic clinic is part of the medical outpatient department, whereas inpatients are cared for in the medical and surgical inpatient units. In the outpatient department, two sections serve outpatients who have diabetes. These sections include a diabetic care section and a diabetic foot assessment section. In the diabetic foot clinic section, three nurses provide foot assessment and foot education to diabetic patients. Meanwhile, there are several nurses with different levels of experience of diabetic care in the medical and surgical inpatient units. Nurses who work in the surgical inpatient unit generally have more experience in providing the diabetic foot care than nurses in the other unit.

6.1.2 Purposive sampling for semi structured interviews

Purposive sampling is also known as judgmental sampling and is frequently used in research employing qualitative methods to gain insight or discover meaning of a particular experience, situation, or historical event. Fain (2004) stated that an advantage of purposive sampling is that it gives the most useful information regarding the type of participants needed and provides rich and in-depth information about particular groups.

Therefore, sampling in this study involved seeking nurses, educators, and diabetic patients who could give valuable information regarding their foot care experiences. These considerations are extremely important in understanding the purpose of the study.

In terms of typical case sampling, Polit and Beck (2008) stated that the participants are selected to illustrate or highlight what is typical or average. The information gathered can be utilised to create a qualitative profile illustrating typical manifestations of the phenomena being studied. To explore the current practice and best practice in foot care for diabetic patients in Thailand, it was first necessary to identify those who undertook the practice of foot care.

In this study, the participants in this semi structured interview consisted of three groups. The first group consisted of the participant nurses. All nurses were interviewed with the version of the questions designed for nurse and educations (in Appendix 2). The second group of participants was diabetic patients. The diabetic patients who come into the diabetic clinic have been examined via foot assessments and have had one or more foot problem. The last group of participants were the educators who are involved in the foot care service in hospital. Nurse educators, who are nurse instructors in Prapokklao Nursing College, teach diabetic care in theory and are involved in providing experience of diabetic care to nursing students with practicing diabetic wound care in the surgical and medical wards in Prapokklao hospital. All educators were interviewed using the questions designed for nurses and educators.

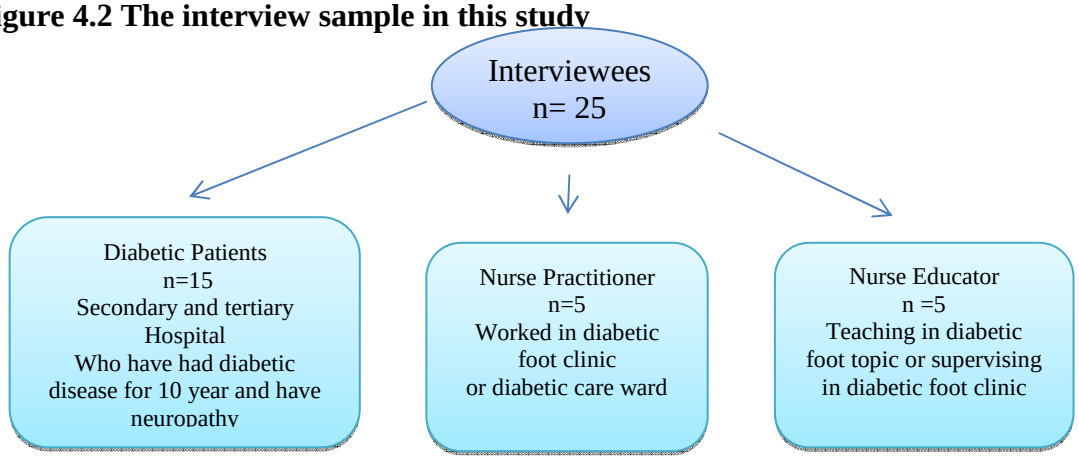
6.1.3 Sample population and sample size in semi structured interviews

In phase I, purposive sampling was used to recruit patients, nurses and educators in Thailand, who had experience in foot care for diabetic patients and who also met the inclusion criteria (Figure 4.2).

Fifteen patients with type 2 diabetes, both male and female, were invited for interview. Only patients who were attending the diabetic clinic in the outpatient department at Prapokklao Hospital were interviewed, as they would have received foot care education and treatment. The criteria for inclusion were having diabetes for at least five years with neuropathic complications or foot ulcers.

Five specialist nurses who had worked in the diabetic foot clinic or diabetic care ward for at least three years or were practitioners in diabetes care, and five educators who specialised in diabetes foot care were selected.

Figure 4.2 The interview sample in this study



6.1.4 Interview schedule design

In order to gain optimal information, interview schedules and interview guidelines were set at interview (Appendix 2) before data collection. Interview field notes were compiled based on responses to the questionnaire, from general to the specialised involving diabetic foot care (Polit and Beck 2008). These were developed using open ended format questions, in order to gain rich and detailed information.

6.1.5 Choice of interview questions used

The interview questions in this study designed to answer the research question. Themes of interview questions were developed from the literature review materials by the researcher and a supervisor approved the content validity. There are two versions of semi structured interview question: version 1 for nurse practitioners and educators (Appendix 2.1), and version 2 for diabetic patients (Appendix 2.2).

Interview questions for nurses and educators comprised 15 questions and used two case scenarios of diabetic patients (Appendix 2.1). The questionnaires explored how to do

diabetic foot care management of patients who have a problem of foot complications such as neuropathy and/or foot ulcer. Moreover, the question relating to the two practical scenarios required the respondents to explore their knowledge of diabetic foot management. Meanwhile, interview questions for patients were designed to explore their knowledge of foot care and diabetic disease and self-management of foot care. The patients' interviews comprised nine questions (Appendix 2.2).

6.1.6 Pilot testing of the interview schedule

A pilot study is a trial or test run carried out to determine the feasibility of a study. This includes the practicalities of implementing a study, as well as trialling data collection tools, such as questionnaires or interviews.

The semi structured interviews were piloted using three patients, two nurses and two educators. The pilot interview data was analysed to see whether the data obtained addressed the research questions and research objectives. Three question changes were required and the order of questions was also modified. The interview schedule was not re-piloted, as the changes were not too significant.

6.1.7 Conducting the interview

Face to face interviews were conducted in a private room offering a suitable and quiet environment in the diabetic foot clinic at the hospital. The interviews lasted between 45-60 minutes, at a time before participants saw the doctors and whenever nurses and educators had free time. For ethical purposes, written consent was taken and a copy of the interview schedule, before each interview. The assurance of confidentiality and anonymity was given to the participants before beginning the interview, helping to place them at ease. Asking permission and giving signed consent for recording were done at the interview, since the researcher was interested in analysing every word to prevent missing important views. Field notes were taken during the interviews and were organised and typed up immediately after the interview ended. The recorded interview was member checked with participants, by a researcher and participants to ensure that

interviewer have understood participants meaning, and then the researcher compared the transcript with the tapes.

6.2 Phase two, the Delphi investigation

This section explains the setting of the Delphi technique, sampling for choice of participant in the Delphi technique, number of experts, and the questionnaire of the Delphi technique.

6.2.1 Setting for the Delphi investigation

In phase two the Delphi techniques was conducted to find agreement of a panel of experts when considering recommendations to nursing practice guidelines. The process of implementing the technique involved three steps: definitions of experts in this study, expert criteria and choosing an expert panel.

6.2.2 Sampling for choosing participants in the Delphi investigation

The researcher decided to select a MDT to be participants because, with diabetic foot care, it is necessary to use a multi-professional team (see Chapter 2). A multidisciplinary team of experts was recruited for this research; which reflected the foot care teams' working practices in Thailand, which depended on the diagnoses of the medical doctor directly, a role not extended to nurse; a nurse would not be expected to diagnose a neuropathic condition.

Selecting the panel involves criteria setting for foot care experts. The experts in this study were those who were involved in diabetic foot care practice (see Table 4.1). The main criteria were health care practitioners who were experts in foot care diabetics and/ or who had knowledge and experience of foot care. The qualification of 'expert' in this study was identified with the occupational position of department head, and authors who had published peer reviewed papers. Rolley (2010) argued that these criteria explored closely the experience of experts who know foot care problems well, in both the medical and nursing fields. These criteria are showed in Table 4.1.

Table 4.1 criteria of expert in foot care

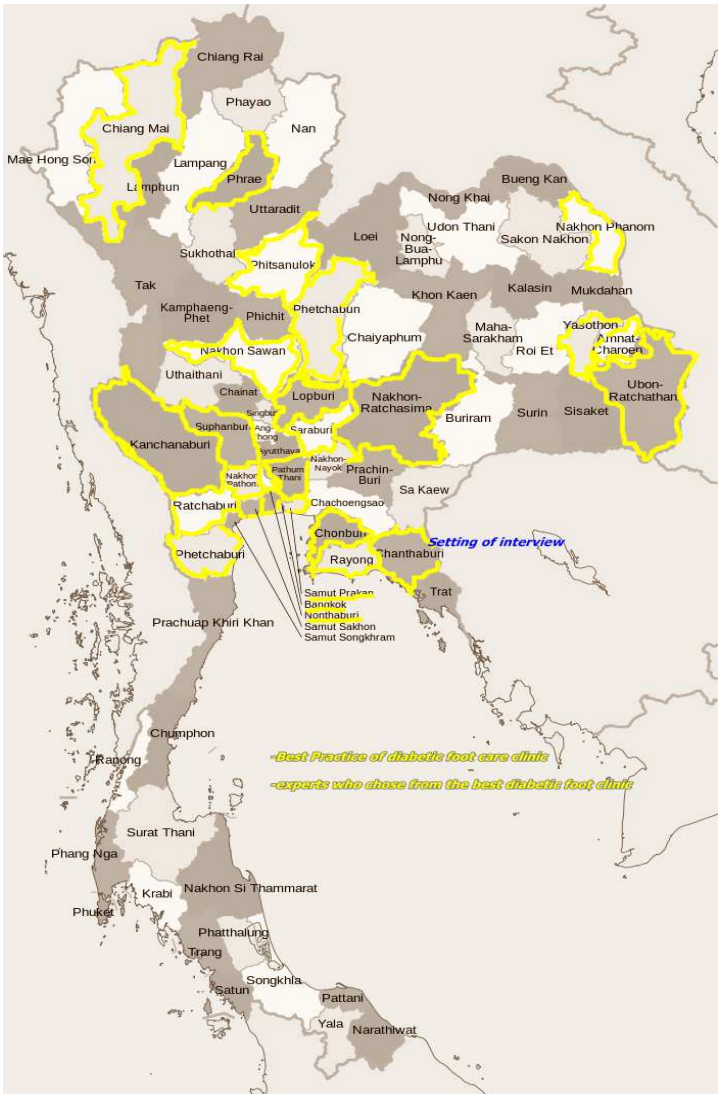
Expert Group	Criteria for knowledge with position and work place	Criteria for experience (at least 1 criteria)
A doctor	-Graduated or worked in Medical field, or Endocrine doctor, or Surgical doctor, Rehabilitation doctor -Worked in position in hospital which provide foot care service or diabetic clinic or - Head of diabetic care service - A consultant foot care team of Thai Association of Diabetes Educator	1.Worked in foot care clinic or provide foot care in ward or department associated with foot care for at least three years 2.Has done research in foot care of diabetic foot care within three years 3.Has published at least one paper into diabetic foot care in the last three years 4.Be a lecturer or a trainer of Foot Care Team of Thai Association of Diabetes Educator
Physio-therapists	-Graduated in physiotherapy -Worked in a foot care clinic or ward associated with foot care -A consultant foot care team member of Thai Association of Diabetics in Thailand	The same criteria as doctor 1-4
Nurses	-Graduated in nursing and worked in the foot care clinic at least three years -Received foot care training - the certification of foot care of the Thai Association of Diabetics in Thailand or any courses related to foot care of diabetic patients -Gained the advanced practitioner nurse level in diabetic field or wound care	The same criteria as doctor 1-4

6.2.3 Sample size of experts in Delphi investigation

Twenty seven experts were selected by purposive sampling from the hospital list of the best practice care in diabetic foot clinics and a tertiary hospital in the capital city (Bangkok) and the regional areas of Northern, North-Eastern, Eastern and Western Thailand (see Figure 4.3 below). All experts were approached face to face or by

telephone, for this researcher to introduce herself and to invite the individual to participate in the panel. Seven experts declined the invitation to be involved. Twenty panel experts agreed to be involved in the Delphi technique (Appendix 3). The panel of experts comprised four medical doctors (diabetes doctors), one surgical doctor, one rehabilitation doctors, two nurse instructors, nine practitioner nurses and three physiotherapists. The numbers of the panel experts was sufficient in this study because of the multidisciplinary and heterogeneous team structure. Likewise, the studies to develop guidelines by Morita et al. (2005) and Ostaszkiewicz et al. (2008) used a MDT structure and in case of Morita et al. (2005), 19 experts were involved.

Figure 4.3 Experts were employed from the best practice foot care clinics indicated in the yellow areas.



6.2.4 The development questionnaires for the Phase two Delphi investigation

The development of a valid and reliable questionnaire is a pre-requisite for a robust Delphi research outcome. The first step in the process of developing the questionnaire was to re-examine the purpose of the study, the research questions, the proposed development of a foot care guideline and the target group used for the panel in the light of the critical review of the literature. As a result of this review, the researcher gained a

thorough understanding of the problems of diabetic foot care management, or the lack of it, at an international and national level. The researcher also identified the lack of any systematic foot care management in Thailand and hence, one can argue, the need for this study.

After developing a thorough understanding of the problems of diabetic foot care as discussed in Chapter 2, the researcher transformed the contents into themes such as foot assessments and statements such as the use of the different types of sensory modalities, which can be used to assess sensation (Appendix 6-1). The researcher also established at this juncture which of the questions would measure knowledge and which ones would measure practice. Since the development of the foot care guidelines involved both theory and practice, it was essential to establish these criteria in the questionnaire. The questionnaire used 'closed questions' as the researcher was seeking responses to specific issues. However, respondents could also include additional information for each statement, which allowed the researcher to gain insights into the management of diabetic foot care in Thailand, which were not available in the current published literature.

Therefore, the questionnaires for the Delphi technique employed the experts as a means of gaining the required foot care knowledge and foot care experience. Each statement addressed the steps of foot examination, foot assessment, items for evaluating foot risk, and appropriate footwear. The main sources of the statements were the literature review and the qualitative materials developed in the first phase of the research.

The first draft questionnaire was developed by the researcher and approved by the supervisor. The experts in foot care, involved in the foot care team, were invited to approve the content validity and language. The process of developing the recommendation in the first questionnaire, by using a systematic review would be explained in a later section.

Following the development of the statements, the researcher then developed the scale of measurement to rate agreement. In this instance, a Likert scale was used and the advantages of this were discussed. The difference scales which could be used in questionnaires were identified via the literature review (in Chapter 2), options included

measurements varied from between a five to ten level on a Likert scale. This study uses three levels of a Likert scale ranging with strongly agree, disagree and agree but need to improve. The reason employing a modified Likert scale employed in this Delphi technique is that the scale can facilitate experts to indicate their level of agreement, as proposed by Keeney et al. (2010). Therefore, this research used a three-level scale questionnaire to avoid the consistent agreement for four or three of all statements that experts consider to be important, as proposed by Jirwe et al. (2009).

Following the completion of the questionnaire, the researcher tested its validity: was the questionnaire relevant to address the research questions, specifically the problematic items found in the review chapter two, and was the questionnaire appropriate for the target group.

The questionnaire was then piloted with three experts. Apart from completing the questionnaires, respondents were requested to comment on the difficulty of answering the questions and to annotate whatever was not clear or not understood. The objective of the pilot was to ensure the questionnaire provided the information that was required and to determine respondents' understanding and acceptance of the questionnaire. There were some minor modifications made, these language and clarification of instruction to participants.

6.2.5 The consensus for the Delphi investigation

In this study, the term consensus is defined as participant agreement at a level of 80%.

7. Data analysis plan

The process of data analysis in this study was divided into two sections; phase one interview data and phase two analysis of data gained from using the Delphi technique.

7.1 Overview of content analysis

Content analysis is a common technique used in qualitative studies. This method is used for narrative data and categorised data in order to identify prominent data themes and patterns among themes (Polit & Beck 2008).This approach is a pragmatic method for qualitative data analysis and is called 'qualitative content analysis' (Sandelowski 2000,

Graneheim and Lundman 2004). It is believed that this is a reflexive and interactive method for analysing the data (Sandelowski 2000). This method has been utilised in nursing research to improve interpretation of data and is applicable for a variety of data to depths interpret and can be used with a variety of data (Graneheim and Lundman 2004).

7.2 Justification of using content analysis

Content analysis is used in this study because it is the least interpretive of data (Sandelowski 2000) and more flexible than other qualitative analysis approaches. Houser (2008 p. 489) defined content analysis as a data analysis method commonly used to describe research designs which rely on collecting data by interviews or document analysis and interpretive coding to identify the themes and patterns. The interview data was transcribed and analysed using thematic content analysis. Content analysis involved coding each piece of information obtained and then grouping similar themes together. In order to give assurance of the credibility or dependability of the data, the transcripts were sent to nurses and educators to check for interpretation and reconstruction of the data. It was not possible to send the transcripts to the patients for validation. The researcher also discussed the results of the syntheses with experts in this field to ensure reliability.

Many reasons can be given to support use of content analysis. The main reason for using it was to make a link between causes (knowledge, understanding, feeling, education programme) and effect (behaviour practice). Content analysis will help to reveal why the foot care practice or guidelines were not effective and explore how effective the foot care provided by nurses was. Data from the second round was analysed using a ranking or rating technique (Jairath and Weinstein 1994). Analysis of the second set of data used a mean and a bi-modal distribution to show the dispersion of scores from the previous round and to demonstrate any lack of consensus (Powell 2003).

7.3 Stages of data analysis

In this section, the content analysis approach will be applied to the first phase of data collection; how the data was analysed will be explained, as well as the interpretation of the findings. There are several steps that are required to come into effect in the analysis of qualitative data, together with the essential steps that needed to be taken (Patton 2002, Graneheim and Lundman 2004, Zhang and Wildemuth 2009).

The process of data analysis involved content analysis. This method was used because the study aimed to identify informational content related to foot care management for Thai diabetic patients, nurses and educators. This analysis technique was appropriate for a descriptive qualitative study because there was no requirement for a deep theoretical framework or a high level of abstraction for the data analysis (Patton 2002). There are two main processes for data analysis: data preparation and the analysis itself. This study followed the seven stages suggested by Zhang and Wildemuth (2009), Graneheim and Lundman (2004). Each step is explained as follows:

1. Preparing data

All tape-recorded interviews were transcribed verbatim from spoken words into texts, a procedure dealt with by a researcher in the Thai language. There is an argument that the translating process had a potential to produce inaccurate data, due to a language barrier (Birbili 2000, Kapborg and Bertero 2002). Therefore, translation from Thai to English was conducted after the thematic analysis.

2. Define the unit of analysis

Data from interviews of 15 diabetic patients, five nurses and five educators were provided in a word document files because this format was required by AtasTi, a software programme used for qualitative data analysis. In maintain confidentially, each participant was assigned a specific code; therefore patients, educators and nurses were identified via a number code instead of the name, these were termed *a unit of analysis* (Graneheim and Lundman 2004).

3. Develop code and categories.

It is necessary to create initial deductive categories and a coding scheme that will guide the analysis. The *a priori* code was defined by the researcher before beginning to analyse the data. The priori codes come from the pre-existing knowledge, theory or a literature review (Crabtree and Miller 1992). In this present study, the *a priori* codes were defined earlier using the research question, literature review and the interview schedule (Tables 4.2 and 4.3). It is suggested by King (1998) that interview schedules are a paramount source for constructing the initial code, where the question in the major schedule can be the higher order code while the sub question can be the lower order code.

Then, categories and a coding scheme can be derived from the data. Some categories were formed based on special areas of investigation and correlated with the objective of the study and research question (Zhang and Wildemuth 2008). Therefore, in this present study, deductive codes under each category were created, based on literature review of foot care management, previous related studies, and theories of foot management.

Table 4.2 Priori coding for interview schedule of patients

Question	Code	Sub-code
1. How long have you had diabetes?	Duration of DM	
2. Do you understand what diabetes is?	Meaning of DM	Cause of DM/ known
3. Did you understand the problem? And do you know your complications?	Knowledge of complication	Knowledge/ Prevention complication
4. Have you developed any complications? For example neuropathy	Perception of complication	
5. Have you noticed any changes to your feet as a consequence of your diabetes?	Changing of DM foot	
6. Do you have any problem with your feet?	Sign and symptom of neuropathy	
7. What information did the nurse/doctor give you about your diabetes? For example foot care, Blood screening,	-Foot care education -Dietary understanding -Dietary education -Exercise	

8. How do you care for your body and your feet?	-Foot self-care -Glycaemia control/poor	
9. Who else at home understands about your illness? Do they help?	Caregiver/helping	

Table 4.3 Priori code interview of nurses and educators

Question	Code	Sub-code
1. How often do you see patients who are diabetic and also have foot problems?	Experience	
2. What kind of foot problems do patients present with? (Foot ulcer, neuropathy, numbness, no sensation, Charcot)	Classify risk	
3. For patients who have foot ulcers and neuropathy what do you do?	-Wound management -Neuropathy management in high risk of foot care	-Dressing/Debridement -Foot care education -Foot wear, Off loading -Skin and nail care
4. For patients who have foot ulcers and no neuropathy what do you do?	-Wound management in low current risk	-Dressing/Debridement -Foot care education -Off loading
5. For patients who have neuropathy and no foot ulcers what do you do?	-Neuropathy management of increased risk	-Vascular assessment consideration -Foot wear evaluation -Foot care education -Patient feet inspection
6. Are you concerned when you see a patient with neuropathy and foot ulcer?	-Assessment of risk	
7. How do you screen for diabetic neuropathy?	-Neuropathy assessment	
8. How often do you screen the diabetic patient with and without neuropathy?	-Experience of neurological assessment	
9. Do you use a structured screening approach to manage the patients?	Structure screening	
10. What form does this structured approach take?	-Assessment the feet -Diabetes history -Medical history -Surgical history -Social factor -Feet examination	-Deformity -Problem of foot wear -Vascular problem -Neurological problem -Presence of ulcers or infection

	-Classify Risk	
11. What advice do you give them?	Patients education advice	
12. What do you teach about daily foot care?	Daily self-care of feet	Daily examination Walking indoors and outdoors with foot
13. Do you think patients can manage foot examination daily?	Patient self-management	
14. What current foot care guidelines do you use?	Assessment Referral system Inspection Reduce risk of ulcer	
15. Does the current guideline work? Why?	Evaluate current guideline	
Question for scenario 1-2		
1. How would you manage this case?	Management of diabetes foot care	-Blood sugar -Risk factor detection -Food Advice -Self-care and self-monitoring
2. What advice would you give her?	-Patients education	-Foot wear -Foot care daily -Foot inspection

4. Test coding scheme on a sample of text and coding all the text of interview data.

The coding can be performed either electronically or by hand on the printed transcripts (Patton 2002, Graneheim and Lundman 2004, Zhang and Wildemuth 2008). This process included testing the coding from the interview transcriptions. In this study, both electronically and hand transcription were used with the printed material, conducted by Atlas Ti software, because the data was clear and the electronic can compute the same code.

Initially, the text data was condensed and segmented into small units and created into groups of words, sentences or paragraphs which contained particular aspects, relating to the purpose of this study. This process is called *data condensation* (Graneheim and Lundman 2004) or *data segmentation* (Hruschka et al.2004), a process which shortens the text and yet still preserved the core. After that, each data segment was read and labelled and then related to the essence identified from the unit of the data. This step was defined as *code* that allowed data to be thought of in different and new ways

(Graneheim and Lundman 2004). Conducting the sample text code, and checking consistency of coding and revising rule of code is an iterative process (Zhang and Wildemuth 2008).

The next process involved reading and re-reading each transcript until an overall understanding of data was achieved. During this process, the repeated checking of the coding was required. The various codes were compared based on similarities and differences within the codes. During this process, the new concept was found and some codes were merged and add to the coding manual (Zhang and Wildemuth 2008). All text data was coded like the example of data reduction and coding that is presented in Table 4.4. Further data reduction and coding of nurses and educators' response are showed in Appendix 7.

Table 4.4 An example of segmenting and coding data in patients

Textual Data	Data segmentation	Code
Q: Do you understand what diabetes is?		
Patient: "*I have known that diabetes will cause thirst and loss of weight. I understood the cause of diabetes is sweet food and genetic. I had a younger sister who had diabetes. Now I know that it caused by weak pancreas and low resistance." (sic)*	Sweet food belief Genetic	Eating sweet food Genetic cause
"I had known diabetes since 30 years. First time I knew because my mother died from diabetes. Nurse advised on the blood glucose test. I thought I got strong and did not continue treatments. I worked in retail sale which resulted in no rest." (sic)	Pancreas loss function	Abnormality of pancreas
	Patients believed that being strong and DM did not affect to body	Don't understand disease

5. Assessing the coding consistency

After coding all the data, the researcher rechecked the consistency of coding by comparing with other codes within each transcript, and across all transcripts (Zhang and Wildemuth 2008, Patton 2002). In this step, the new code was found in the original and a consistency check was added while some coding was changed subtly overtime (Mile and Huberman 1994). In order to prevent greater inconsistencies, the researcher rechecked the coding consistency. To do this, the primary analysis was carried out and regularly discussed between the researcher and her first supervisor.

6. Drawing conclusions from the coded data into themes

Transcripts were independently coded and a list of emerging themes and categories was identified (Zhang and Wildemuth 2008).The code and categories were identified for their relationships in this step. Initially, codes were grouped into the categories related to a commonality or relationship shared within a group of codes (Graneheim and Lundman 2004). In this step, the categories, not related to the purpose of this study were excluded because of a lack of suitable categories (Graneheim and Lundman 2004). In this step, the researcher explored the dimensions and properties of categories and identified relationships between categories. For example, as presented in Table 4.4, the code *eating sweet food*, the code *genetic cause* and the code *abnormality of pancreas* were grouped together because both originated from data segments that expressed knowledge of the cause of diabetic and addressed the research question regarding to the current practice of diabetic patients.

After categorising codes, the process of generating themes was conducted. Each category or group of content area or code was reviewed and created a structured meaning that linked the underlying meanings together in code and categories (Graneheim and Lundman 2004). In this present study, there were two levels of themes: themes and sub-themes. In particular, themes were made to answer the research questions, such as knowledge of foot complications resulting from having diabetes. Moreover, sub-themes were related to categories of codes. A sub-theme can be created to accompany a theme. Themes, sub-themes and codes are demonstrated in the sample in Table 4.5 (further information showed in Appendix 7.3) and this relationship was

discussed and reviewed by the researcher and supervisors in order to minimise the researcher's bias. The final outcome of this step was a hierarchical category of codes, sub-themes, and themes. The important issue of this step is to ensure that condensed meaning unit codes and a category can be captured by more than one theme (Graneheim and Lundman 2004).

Table 4.5 Sample of codes, sub-theme and themes that emerged from the interview data

Theme of patients	Sub-theme	Code
Knowledge of DM Complications		- Retinopathy (5) - Heart(4) - Hypertension (3) - Brain (2)
	Knowledge of prevention	-Can prevent (7) -Knowledge of Preventing complication (7) -Don't know how to prevent (6)
	Presence own complication	-Observe abnormal signs from treatment (1) -Foot ulcer (1) -Hypertension (12) -Cholesterol (8) -Gout (2) -Renal (2) -Thyroids (1) -Urinary retention (1) -Retinopathy (4)
Knowledge of diabetic foot Complications	Changing of DM foot	-Changing of DM foot (15) -Neuropathy with unknown cause (3) -Never observe (1) -Changing of DM foot---Not relevant (1) -Motor nerve damage (1)
	Signs and symptoms of neuropathy	-Problem of Neuropathy (14) -No problem of neuropathy(1) -Loss sensation (4) -Numbness (11) -Itching and tingling (10) -Pain at night (3) -Burning (3) -Fungus (1) -History of foot ulcer (5) -Callus (3) -Deformity (5) -Pain all day all night (3) -Skin cracking and skin changing (8)

8. Reporting method and finding

In theory, the process of qualitative content analysis should go on and report as completely and truthfully as possible (Patton 2002). The common way in practice of content analysis reported the typical quotation to justify conclusions (Schilling 2006) and demonstrated another display of charts (Miles and Huberman 1994).The step of reporting the data in part of theme description will be explained in the next chapter.

8. Data collection

This study consists of two phases. In phase 1, data collection was via semi structured interviews that were carried out by the researcher during January 2009 - March 2009. In phase 2, data collection was via questionnaires during September 2009 – May 2010. The questionnaires were posted to the panel of experts. The Delphi process was repeated twice in order to arrive at a consensus on developing foot care guidelines for diabetic patients.

8.1 Interview procedures

The semi structured interviews involved:

-Specialist diabetic nurses who working in diabetic foot clinics at Prapokklao Hospital, Chantaburi and nurse educators who specialised in diabetes foot care were interviewed in the diabetic clinic for about one hour, in order to explore current practice and to identify problems regarding the usage of nursing guidelines regarding foot care for diabetics in Thailand. Nurses and educators were asked questions and were given a scenario regarding foot care education and foot care management for diabetic patients (Appendix 2.1).

-Diabetic patients who attended the follow-up treatments in the diabetic clinic at Prapokklao Hospital Chantaburi, Thailand were interviewed by the researcher to explore the need for health education and the prevention of the diabetic foot (Appendix 2.2). Interviews were conducted for about 45 minutes in an interview room adjacent to

the diabetic clinic, while patients were waiting to see the doctor. Their place in the queue was not interrupted.

8.2 The process of guideline development - A conceptual framework of Soukup (2000)

Many steps are required to remain validity and reliability of process in developing guideline (Shekelle et al. 1999, Thomas 1999). In this section, the guideline development will be explained and the process this used.

This study aimed to develop nursing practice guidelines for enhancing foot care of diabetic patients. Therefore, it focused on both the available evidence and the views of the expert panel in developing a consensus because this method provided sufficient resources in the issues of clinical skills, experiences and individual bias and was balanced from the group process in multidisciplinary groups (Shekelle et al 1999). The process of guideline development was based on the developing guideline framework of Shekelle et al. (1999) and the evidence-based practice model of Soukup (2000). The Soukup's model was used to inform the construction of a conceptual framework to develop the nursing practice guidelines. This model is dynamic, with a spiralling movement that includes four interactive phases: evidence-triggered, evidence-supported, evidence-observed, and evidence-based phases. The process of developing nursing practice guideline is explained step by step, as fellows.

1. *The identification and refinement of the subject area of a guideline*

The first step of developing this particular guideline process is the identification and refinement of the subject area; in this case of foot care in diabetic patients (Shekelle et al. 1999), by reviewing knowledge evidence, research findings, and clinical expertise, including stakeholder interviews.

2. *Running the group of guideline development*

The second process was to convene the project management group of guideline development (Shekelle et al. 1999). This study into developing nursing guidelines for diabetic foot care brought together a mixed group of experts in order to approve the

final recommendations for the nursing clinical guideline. Meanwhile the researcher and the supervisory team would identify, synthesise and interpret the relevant evidence through the best clinical practice guideline.

3. Identification and assessment of the evidence

The third process is to identify and assess evidence relative to the clinical question (Shekelle et al. 1999).In this step, the process of identifying and assess evidence that is called in *evidence-trigger phase* in Soukup model (2000). It used two processes.

Firstly, the knowledge trigger (Soukup 2000), which refers to document research, this was done by analysis and studying foot care intervention guidelines for diabetic patients, key concepts of foot care guidelines and problems of foot care of diabetic patients in Thailand in the literature search phase. Some contexts of foot care and personal reflection were included in this searching, because some evidence showed updated information. Such evidence was assessed and identified relative to the clinical question to set the boundaries for the inclusion of evidence. For example, the question of the efficacy of foot care management was considered, as was the question of the risk of foot complications.

Secondly, the problem-focused trigger (Soukup 2000), which refers to clinical questions raised by clinicians and from data sources within the organisational systems that monitor practice patterns. To address this phase was conducted by interviews with specialist diabetes nurses who work in diabetic foot clinics, nurse educators who specialise in diabetes foot care and patients, to identify problems regarding the use of foot care nursing guidelines and to explore the need for health education and prevention of the diabetic foot, specific to Thailand.

Then, all data from the systematic analysis of evidence and interviewing was extracted as concepts for developing foot care guidelines (Shown in Table 4.6) and was evaluated by the researcher and the supervisory team. Furthermore, data from evidence was summarised into the three conceptual categories of benefits, harms and interventions (Shekelle et al. 1999), while interview data were extracted as themes related to concepts that supported the foot care guideline development.

It is suggested by Shekelle et al. (1999) that the summarised evidence is categorised with the classification schemes in order to reflect the susceptibility to bias. Therefore, in this nursing practice guideline, the category of evidence was created, based on the GRADE method classification scheme, a proper approach used to assess the quality and to grade the level of well-designed evidence. This was used to categorise the effective study (as shown in Appendix 6.1.3).

4. Translation of evidence into a recommendation

This process produces recommendations in an early draft of the nursing practice guideline. Each concepts of the key component in foot care management (Table 4.6) was explained with recommendations which translated evidence, this step is called the evidence–supported phase by Soukup (2000). Each proposed initial recommendation was created and formulated from the literature review and interview findings. All recommendations are reported to link available evidence (Appendix 6.1.3).

Consequently, it is recommended by AGREE II (2009) that developing recommendations should concern both health benefits and risk. Therefore, this guideline includes discussion on the caregiver's role and some of the difficulties they faced. Other recommendations in this study were formulated from research findings, interview findings and existing clinical guidelines. Description of the linkage between the evidence and statement of recommendation are provided in this process and will be explained in Chapter 6 and the full description in Appendix 6.1.3.

5. Review and update the guideline

It is stated by Shekelle et al. (1999) that a recommendation based on experience and clinical judgment is likely to include bias and self- interest. Therefore, expert opinion is more susceptible to those than literature review finding. The final step of the guideline development process is formulating, reviewing and updating the guideline by formal consensus technique employing the classical Delphi technique. Recommendations were reviewed by consensus of opinion by the expert group, which comprised members who were experts in foot care in the context of Thailand supported by published evidence. The researcher chose the mixed group of foot care experts in Thailand to review the

content validity, applicability and validity of the recommendations in the draft of nursing guideline. This step, assessing the veracity of experts' opinions and updating their recommendations involved non face-to-face communication in order for the experts to feel free to express their opinions and make agreements about each recommendation. The result of the Delphi technique and opinion of the experts influenced the alignment with late recommendation and the final vote. The final recommendation for the nursing practice guideline was reviewed by the researcher based on the consensus agreement of the panel of experts. This was found to be an efficient means of combining the expertise of a geographically dispersed group. The Delphi technique also represented a useful methodological tool for problem solving, planning, and forecasting.

8.2.1 Questionnaire development -a set of nursing practice guideline

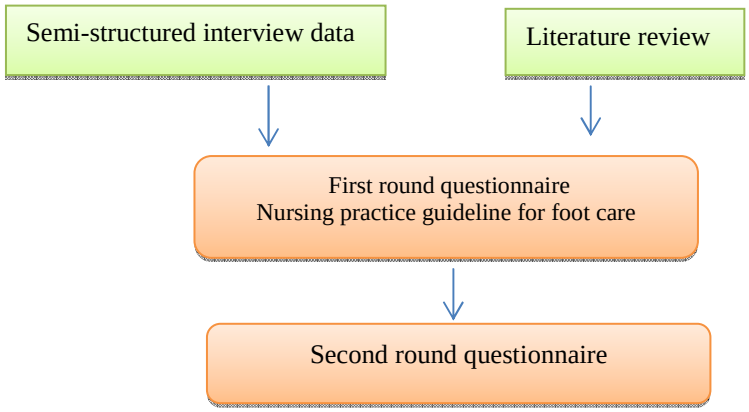
The themes, elicited from the interview data and the literature review were modified in the draft questionnaire for the nursing practice guidelines (Table 4.6). Those themes were developed and grouped. The topics were developed and the statements were modified, based on the clinical guidelines of NICE (2004), IWGDF (2007), and RNAO (2004). The final set of guidelines was made up of ten sub-section topics and thirty-seven recommendations (Appendix 6.1). Each recommendation contained the statement of foot care management which asked for the agreement using the three level Liket scale and an open ended question to gather comments from respondents (Figure 4.4).

Table 4.6 The source of key elements of foot care management for developing a set of clinical nursing guidelines

Theme	Literature review	Interview data
Patient empowerment	√	√
Continuing professional development	√	√
Foot examination and monitoring	√	√
Holistic assessment	√	
Classify of risk factors	√	√
Care of people at lower current risk	√	
Care of people at increased risk of foot ulcer	√	
Care of people at high risk of foot ulcer	√	
Care of people with foot ulcer	√	
Vascular assessment	√	
Patient education		√
Education of nurses		√

All these recommendations were included in the first questionnaire of the Delphi technique (the full version is in Appendix 6-1-3).

Figure 4.4 Process of questionnaire development in this Delphi technique



8.3 First and second round questionnaires of the Delphi technique

The process represented in Figure 4.4 consisted of two round questionnaires. The first questionnaire (Appendix 6.1.1) was a set of 37 statement formatted as a provisional nursing practice guideline based on the interviews in phase one of the study and a critical review of the literature on foot care principles, using Soukup's (2000) method.

In first round, the questionnaires were divided into two types. The first type contained closed questions of recommendations of clinical nursing guideline and were answered by the rating the agreement with a three point Likert scale on three scores (agree, disagree and have to improve). The second type of question was open ended questions in order to access respondents' comment and opinions about their practice. Participants were invited to add any additional comment or suggestions that they thought were important for diabetic foot care in Thailand. The purpose of this first round was to identify core components of foot care for diabetic patients, which were to be addressed in a later round.

Together with the questionnaire, the letter provided the objective of the questionnaires, consent form, and information about the duration of answering the questionnaires, name of researcher, address and contact number. The questionnaires, self-addressed return envelope letter and a consent form were posted to the 20 panel of experts to elicit and ask for their opinion regarding each statement. During the next two weeks, the researcher followed up the initial contact letter by telephone or face to face in case of any delay in returning the required documents caused, for reasons that might relate to participant's works and/or available time. This approach achieved a response rate of 18 (90%). The findings from the first questionnaires were analysed and the core components identified and used to develop a second questionnaire. Murphy et al. (1998) suggested that panel feedback is paramount in the Delphi process.

Following round one, the researcher summarised the participants' responses and if a consensus level of 85 % had been reached, items were kept in round two questionnaires. Data feedback and agreement of questionnaires were summarised.

In round two, based on the feedback from the first questionnaire, a second questionnaire was developed (Appendix 6.1.2) and sent to the panel of experts in order to reformulate and confirm the core components of a set of foot care nursing guidelines. Once again, self-addressed envelopes were also provided for the return of the questionnaires. Moreover, the comment of all panel members in the first round were anonymously provided to all experts, in order to show the conclusions and suggestions of all panel members.

The role of the second and subsequent rounds was reviewed. In considering the use of additional rounds of questionnaires, time, cost and possible participant fatigue needed to be taken into account (Powell 2003). For these reasons, this study was planned using only two rounds of questionnaires. It was anticipated that consensus would be achieved following two rounds of consultation. However, contingency plans were developed for additional rounds of questionnaires if consensus was not reached after the initial two rounds.

9. Summary

This chapter has discussed the methodological approach used for this study. It has justified why a qualitative paradigm was used and has also set out the different methods of data collection which used semi structured interviews and the Delphi technique. The study was conducted in Thailand: all interviews were carried out at Prapokklao hospital, Chantaburi. The interview sample consisted of five nurses, five educators and 15 diabetic patients. Following the interviews and a critical literature review, the first questionnaire was developed. Following responses from the panel of experts, the questionnaire was modified in round two until agreement on all items was achieved. The Delphi panel consisted of 20 experts in the field of diabetes from across Thailand. All the data was collected by the researcher. Ethical approval was gained from DMU and permission was obtained from the relevant hospitals to conduct the research. A pilot study was carried out and some minor changes were made to the interview schedule. No

re-piloting was carried out for the reasons outlined earlier. The interview data was analysed using a content analysis. The findings from the interviews and the Delphi technique will be discussed in the next chapter.

Chapter Five: Findings and Discussion of Interview Data

1. Introduction

This chapter describes and discusses the qualitative data interview findings. The semi structured interview findings from nurses, educators and diabetic patients were analysed to explain how foot care was managed in Thailand, and to develop the core components of the foot care guidelines. The major and core categories were extracted to develop the questionnaires for the Delphi technique, which is discussed in the next chapter:

2. An analysis of qualitative data to develop the core category of interview data

The purpose of gathering the responses from the semi-structured interviews was to understand the contemporary practice of foot care by nurses, educators and diabetic patients. Data collection for this study was in the Thai language, as this is the main language used in the hospitals of Thailand. The participants were of Thai origin and familiar with this language. Hence, to ensure the meaning of the language of the respondents, the data was not immediately translated into another language, as recommended by Patton (2002). Instead, the raw data was analysed using content and thematic analysis. After the thematic analysis, themes, patterns and quotes were extracted. The findings were then translated from Thai to English.

All interview data were transcribed into a text document. Data reviews included reading for content and noting quality. The coding of raw data from the semi structured interviews in the Thai language was developed using Atlas-Ti software. This is a software system for managing, supporting and organising research involving qualitative data analysis.

Due to the contextual nature of the data collected in this study, the raw data was first subjected to content analysis. Content analysis is a method to extract themes and patterns by searching the text. In general, Patton (2002) suggests that content analysis is used to refer to sense-making efforts and to identify core consistencies and meanings from the qualitative materials.

After the data analysis, the next step in this study was the creation of deductive categories and codes. Some categories were formed based on special areas of investigation and correlated with the objective of the study and the research questions. Moreover, deductive codes under each category were created, based on the literature review. Deductive categories and areas of analysis for patients, nurses and educators are shown in Tables 5.1 and 5.2 respectively.

Table 5.1 Deductive categories and areas of analysis of patients

Categories	Areas of analysis
Duration of diabetes	1) Onset of disease
Understanding of diabetes	1) Meaning of diabetes 2) Cause of diabetes
Perception of diabetic complications	1) Knowledge of complications 2) Prevention of complications 3) Current complications
Foot complications	1) Signs and symptoms of foot problems 2) Category of foot problems 3) Duration of foot problems 4) Signs and symptoms of neuropathy 5) Perception of foot problems
Diabetes education	Information given by nurses or doctors involved in diabetes care: foot care, blood screening, food control, nutrition, exercise, medication.
Foot self-care	1) Daily foot care 2) Method(s) of foot care

Helper/ caregiver	1) Activity of helping 2) Disease perception of caregiver

Table 5.2 Deductive categories and areas of analysis for nurses and educators

Categories	Areas of Analysis
Classification of foot problems	1) Category and characteristic of foot problem 2) Classify foot problem
Foot examination/screening	1) Neuropathy assessment 2) Neurological assessment 3) Structured assessment 4) Risk management 5) Management of foot screening
Wound management	1) Wound assessment 2) Wound care
Patient education	1) Daily foot care 2) Diabetic care 3) Self-management 4) Attitude of patients to self-care
Guideline utilisation	1) Structured screening approach 2) Referral system 3) Guideline problem

Following deductive categorization and analysis, two major themes of knowledge and education were identified as shown in Table 5.3

Table 5.3 Major themes from analysis

Major Themes	
Patients	**Nurses and Educators**
-Knowledge and understanding of condition/disease -Diabetes and foot care education	-Knowledge and understanding of condition/disease -Diabetes education and practice -Knowledge of management of diabetes foot care

The following section shows the demographic profiles of patients, nurses and educators respectively. This section explains the background of participants in this study.

3. Demographic data of participants

There were 15 diabetic clients involved in this research, recruited from two diabetes units. Five nurses were recruited from three diabetes units of Prapokkloa Hospital, Chantaburi Province and five educators were recruited from two departments of the Prapokklao Nursing College, Chantaburi Province, Thailand.

The demographic data in Table 5.4 indicates that a higher percentage of female patients (80%) had diabetes compared to male patients (20%). The duration of diabetes, which is a significant factor in the development of foot complications, showed that nearly half of the group (46.7%) had diabetes for over 15 years, with 26% having diabetes between 6-14 years and 27% having diabetes for less than five years. Within the same sample, 93.3% had neuropathy, 26.7 % had foot deformities and 33.3% had a history of foot ulcers.

Table 5.4 Demographic data in type 2 diabetes patients

Demographic data	**N**	**%**
Gender		
Male	3	20
Female	12	80
Duration of Diabetes (Mean 4-30 yrs.)		
Less than 5 years	4	26.67
6-15 years	4	26.67
More than 15 years	7	46.66
Foot complications		
History of foot ulcer	5	33.33
Foot neuropathy	14	93.33
Foot deformity	4	26.67

The demographic data for practitioners involved with diabetic patients shows that the medical personnel were all females. All nurses and educators had direct experience in

working with diabetic patients in clinics and the wards, while the educators had experience involving diabetic patients with foot ulcers when they supervised students on the wards, as shown in Table 5.5.

Table 5.5 Demographic data of nurses and educators

Demographic data	N	%
Gender		
Male	-	-
Female	10	100
Duration of working in diabetes clinic (nurse)		
1-3 years in diabetes clinic	3	30
3-6 years in diabetes clinic	2	20
Experience of working with diabetes patients (educator)		
1-5 years in relevant ward	2	20
5-10 years in relevant ward	1	10
10-15 years in relevant ward	2	20

4. Knowledge and understanding of disease

The effective prevention of foot problems in diabetic patients depends on nurses, educators and patients having knowledge and understanding of the disease. The patients, nurses and educators were asked specific questions regarding their knowledge of the disease and its prevention and control via optimal foot care. Five items were used to explore their knowledge and understanding of diabetes.

4.1 Analysis of patients' interview data

Knowledge and understanding of the disease: Eight patients (53.33%) indicated that they knew the causes of diabetes. Only six patients (37.5%) indicated that they understood the disorder of diabetes. Several causes were identified: such as the

abnormality of their genes (26.67%), the pancreas (20%), eating sweet foods (6.67%) and smoking (6.67%). Three patients (20%) mentioned that diabetes was an incurable disease. The following quotes from the interviews indicate the knowledge and understanding that patients had of their illness:

'*I understood the first time that the sweet eating causes diabetes disease. I now know that the cause of diabetes is weakness of pancreas or malfunction.' [P 1]*

'Nobody explained what diabetes is or the cause of diabetes.' [P12]

Another participant complained that '*I still did not understand the cause of diabetes.' [P 9,15]*

'Doctors had never told anything regarding diabetes. I knew that I should not eat sweet foods'. [P15]

'*This illness will always be with me.' [P 6]*

'*I knew that diabetes will cause thirst and loss of weight. I understood the cause of diabetes is sweet food and genetic. I had a younger sister who had diabetes. Now I know that it is caused by weak pancreas and low resistance.' [P 2]*

Moreover, the data indicated that some participants were unaware of diabetic complications. Two patients (13.33%) stated that they had diabetes for 20 years but were not initially concerned about the potential, long-term complications. However, they were now concerned because of developing foot problems, as well as having episodes of hypoglycaemia. One client indicated that she had stopped treatment after 10 years and had consequently developed foot ulcers [P 12]. Meanwhile, another participant said that *'I had been diagnosed with diabetes for 25 years. I knew my disease and ignored treatment because I thought I had a strong body at the time.' [P 9]*

'I had known I had diabetes for 30 years. I knew because my mother died from diabetes. Nurse advised me to do the blood glucose test. I thought I got strong and did not continue treatments. I worked in retail sale shop which resulted in no rest.' [P 5]

Another client indicated that she developed diabetes after giving birth to her child. She was prescribed medications which caused her to develop several side effects. *'After I had medicine, I had nausea, vomiting, and dizziness. I fell down on the bus. My husband asked me to stop treatment which I did and had no further side effects. In 2007 I had a foot ulcer and went to check up my blood glucose again and restarted treatment.' [P12]*

Knowledge and understanding of complications: Fourteen patients (93.33%) who had developed a complication from diabetes knew that the disease could lead to many complications. Individuals also reported the following complications: nephropathy (60%), retinopathy (33.33%), heart disease (26.67%), hypertension (20%), high cholesterol (13.33%), and strokes (13.37%). Seven patients (47.67%) knew that diabetic complications could be managed via food control (26.67%), glycaemia control (20%), and exercise (13.37%). Six patients (40%) did not know what interventions were necessary to prevent complications. Two patients (13.33%) did not mention complication prevention. The following comments from two participants indicated the level of knowledge and understanding that patients have:

'I had a problem of eye, bleeding in retina, still have eye problems and saw green. After treatment, I have blurred vision and hyperglycaemia, so I tried to drink panda leaf boiled in water and papaya boiled in water for 3-4 months. My eyesight got better.' [P 7]

'I observed my body after using insulin injection; my eyesight got very blurry, so I stopped injections. After that, my eyesight got better. But I didn't tell a doctor about stopping injection. I was afraid of be blamed by doctors.' [P7]

Unfortunately, patients appeared to benefit from stopping the diabetic treatments without realising that the benefits were temporary and that unless hyperglycaemia is controlled, diabetic complications will occur in the longer term.

Presence of diabetic complications: All 15 patients (100%) perceived themselves to be at risk of developing complications. In the sample, 12 patients (80%) had hypertension, eight patients (53.33%) had high cholesterol, four patients (26.67%) had retinopathy, two patients (13.33%) had nephropathy, two patients (13.33%) had gout,

and one patient (6.67%) had urinary retention and thyroid abnormality. One patient (6.67%) participant had a foot ulcer for at least six years and recurrent foot ulcer every one to three years.

Neuropathy and foot complications: Fourteen patients (93.33%) already had existing neuropathy and most of them did not know that the symptom was related to diabetes. Five patients (33.33%) had a history of foot ulcer. Most of the patients (n=13; 86.67 %) had observed abnormalities or changes to their feet as illustrated in Figure 5.1 (below). The neuropathic characteristics of participants were: numbness (n=11; 73.33%), itching and/or tingling (n=10; 66.67%), skin darkening and cracks appearing (n=8; 53.33%), a burning sensation of the leg and at times loss of sensation (n= 3; 20%), pain all day and all night (n= 3; 20%), pain at night (n=3; 20%), foot deformity: claw toe, Charcot foot, bunion (n= 4; 26.67%), callus (n=3; 20%), fungal infections (n=1; 6.67%), and previous foot ulcer (n=5; 33.33%). Participants were not aware that their foot problems were caused by diabetes. They also revealed that when they reported pain in the feet, the doctors made no interventions: '*didn't do anything for this problem.' [P 9]* This comment was similar to other patients:

'I had had foot numbness for two years. It felt like a cramp, tingling and this often appear at night and immediately. It gave me insomnia. My feet lose feeling when injured. I had had a previous foot ulcer that caused rock hitting and big toe amputation.' [P4]

4.2 Analysis of nurses' interview data

Eight items from the interview schedule were used to assess nurses' knowledge and foot care practices. Fifteen sub-items explored the knowledge of diabetes management in relation to the following three issues: patients with foot ulcers and neuropathy, patients with foot ulcers, and patients with neuropathy**.**

Knowledge and practice of nurses: Information about knowledge and practices was based on interview data and assessed from the scenarios gained from nurses. This section examines nurses' knowledge of the characteristics of foot problems according to

nurses' experiences, and the management of diabetic patients with complications in three groups: 1) diabetic patients with both foot ulcers and neuropathy, 2) diabetic patients with foot ulcers, 3) diabetic patients with neuropathy. This section also involved screening for diabetic neuropathy, and structured screening approach to managing diabetes.

The form of foot problems seen by nurses: Five nurses (100%) stated that inappropriate footwear was the main factor causing diabetic foot problems, followed by numbness and foot ulcers. Nurses reported that the common forms of deformities found in diabetic patients were Charcot foot (Participant 1 in Figure 5.1), bunion (Participant 2 in Figure 5.1), flat foot, hammer toe, claw toe and hallux. Two of the nurses stated that foot deformity was difficult to assess because they had never seen the characteristics of each deformity. Additionally, nurses reported seeing abnormal skin: cracked skin, dry skin, colour change, fungus, callus and thick nails (Participant 3 in Figure 5.1) as well as the foot ulcers (Figure 5.2).

Figure 5.1 Foot deformities and foot ulcer present in sample group

Participant 1 with a foot deformity like Charcot foot

Participant 2 with a foot deformity like Bunion

Participant 3 with skin changes

Figure 5.2 Foot ulcer in Thai participant

Notes: Pictures in Figure 5.1 & 5.2 reproduced by permission from participants and relevant authorities (Appendix 4)

Diabetic patients with foot ulcers and neuropathy: when nurses were asked how to manage patients who had a foot ulcer and neuropathy, three nurses (60%) considered a patient who had a foot ulcer as a priority in terms of foot or ulcer care and would refer the patients for ulcer management (dressing or surgery). Two nurses (40%) stated that it is vital to assess the wound prior to making any management decisions, and three nurses (60%) considered foot examination for neuropathy by using a 10 G monofilament (Semmes-Weinstein). All five nurses (100%) indicated that they would refer patients who had a foot ulcer to doctors or the surgical teams, while three nurses (60%) stated that they would not do anything with foot deformity, but would advise the patient about wearing the appropriate diabetes footwear (Rajprachachamachai Styles in Figure 5.3). Additionally, two nurses (40%) reported that if diabetic patients had foot deformities, they would refer them to the physiology department for off-loading and appropriate footwear. One nurse stated that

'When I found deformity case such as claw toe or hammer foot, appropriate footwear would be suggested to the patient but no referral to physiology to mould appropriate footwear.' [N 2]

Figure 5.3 Footwear for diabetic patients of Rajprachachamachai styles

All nurses reported that neuropathy was diagnosed by doctors. Nurses assessed neuropathy using only monofilament examination (Figure 5.4), taking a patient's history and recording on an OPD card. One nurse (20%) reported that patients with calluses were advised to wash and polish calluses with brushes while one nurse (20%) trimmed calluses.

Figure 5.4 10 G Monofilament that used in Thailand

Diabetic patients with foot ulcers: When nurses were asked how they would manage patients who had foot ulcers without neuropathy, the five nurses (100%) all indicated that they would refer the patients for wound dressing. Only one nurse (20%) indicated that she would refer the patients for vascular assessment such as ABPI and a Doppler test. One nurse (20%) reported that she would give advice on footwear and foot care, while another two nurses (40%) reported that they would give advice on how 'to avoid putting weight' when walking.

Diabetes patients with neuropathy: When nurses were asked how they would manage patients who had neuropathy and no foot ulcer; all five nurses (100%) indicated that they would give advice on daily foot examinations and daily foot care to every patient. Four nurses (80%) advised appropriate footwear such as the Rajprachachamasai footwear style (see Figure 5.3) or sports shoes. One nurse (20%) mentioned that she would advise patients to wear socks and apply lotion, while the other (20%) reported that she taught patients to do foot exercises. There are reports of nurses involving foot assessment in patients with neuropathy.

'I did not refer patients who have neuropathy to see specialist doctor. Patients with absence pulse by Doppler test. I did not refer to advance treatment such as ABPI test or see specialist doctor. [N1]

'Regarding patients with neuropathy, I did not make appointment every 3-6 months to review foot examination because all patients have to screen foot problem annually' [N2]

All patients with a foot deformity would be assessed for neuropathy once a year and, as cited above, four nurses (80%) suggested appropriate footwear such as sports shoes or Rajprachachamachi style shoes (Figure 5.3). Only one nurse would consult the physiotherapist for moulded shoes and off- loading. Meanwhile, four nurses (80%) did not advise or encourage patients to wear appropriate footwear.

Screening for diabetic neuropathy: All nurses (100%) indicated that they would use the recommended 10 G monofilament test. Additional testing for such issues as taking a patient's history (n=3), numbness (n=2) and vascular assessment (n=2) were also mentioned. Regarding the number of screening sites on the sole of the foot, four nurses (80%) indicated that they used 10 sites whereas one nurse (20%) reported that she used only four sites on the sole of the foot.

Regarding neuropathy, one nurse (20%) reported that, if there was loss of sensation in any one of the 10 sites tested, neuropathy was present. The other nurse (20%) said that if one site out of four sites had a loss of sensation, neuropathy was present. Another nurse (20%) reported that if there was loss of sensation in three out of 10 sites, it was

positive indicator of neuropathy. In addition, two nurses (40%) stated that patients who had no sensation, or a loss of sensation in four out of 10 sites confirmed neuropathy. Protective sensation is present at each site if the patient correctly answers two out of three applications of the filament. Protective sensation is absent with two out of three incorrect answers, and the patient is then considered to be at risk of ulceration.

When screening for neuropathy in patients, three nurses (60%) reported that they often screened diabetic patients with and without neuropathy. Three nurses (60%) reported that foot examination patients were not then classified according to the risk group. One nurse stated that:

'I screened only monofilament and structured approach and did not assess neuropathy. Doctor would classify neuropathy.' (N 1)

As highlighted by nurses, participants reported on the management of diabetic patient who have neuropathy.

'Nurses explained that patients who had neuropathy were classified into the same group of diabetes complications such as heart disease.' [N1]

Structured screening approach to managing diabetes: When nurses were asked if they used a structured approach to screen for diabetes, five nurses (100%) reported that they used the structured screening approach in diabetic patients with monofilament testing and palpation. However, risk groups were not classified after screening. The form of the structured screening approach involved attention to palpation, positions, history of pain, burning and numbness, foot ulcer history and amputation, foot deformity, skin and nail assessment, appropriate footwear, joint movement and eyesight. Regarding pain assessment, two nurses (40%) reported that they assessed only calf pain history on a record form. One nurse (20%) stated that she would assess the type of pain: burning numbness or tingling, presence of symptoms in the calf or in the feet, time of symptoms appearing during the day or at night, reduction of pain: walking, standing or resting. After pain assessment, the nurse did not do anything or offer any suggestions to manage the pain. The other nurses (40%) did not assess pain symptoms in the patients.

Skin and nail assessment were reported by all five nurses (100%) as were examinations for dry skin, callus, nail thickness, ingrown nail, and infection with fungal disease. Additionally, two nurses (40%) stated that warts and joint movement were assessed and recorded in the form. One nurse (20%) reported that cracked skin was evaluated but no detailed record was made, while one nurse (20%) accepted that foot temperature was never assessed.

Three nurses (40%) indicated that they assessed for foot deformities such as claw toe, bunion (hallux valgus), Charcot foot, flat foot, foot drop and metatarsal head. One nurse (20%) reported that she was not confident enough to classify foot deformities because she had not seen some of these deformities in practice.

As highlighted by nurses, participants reported problems in foot assessment and the problems of followed up.

'According to palpating the feet, I did examine the dorsalis pedis palpation. In case of normal or full, or weak palpable at dorsalis pedis position, a doctor suggested that it was unnecessary to assess the Doppler examination. There is no ABPI test in all patients.' [N1]

In addition:

'Patients feet were examined annually and only the risk group were classified. All risk patients who have neuropathy or foot ulcer were not recommended to receive further examination.' [N1]

4.3 Analysis of educators' interview data

Five educators were interviewed to assess their knowledge on the management of foot ulcers and neuropathy, foot ulcers, and neuropathy. Fifteen sub-items explored their knowledge of the management of diabetes of three problem issues: patients with foot ulcers, patients with neuropathy, and patients with both foot ulcers and neuropathy**.**

4.3.1 Knowledge and practice of educators:

Information concerning knowledge and practices of educators was gained and assessed from their interview data and scenario cases. This section involves the characteristics of foot problems of patients in the educator's experience, diabetic management of patients who have complications in three groups: diabetic patient with foot ulcers and neuropathy, diabetic patients with foot ulcers and diabetic patients with neuropathy, together with screening for diabetic neuropathy, and structured screening approach to managing diabetes.

The form of foot problems seen in diabetic patients: Five educators (100%) reported that the most common problem in diabetes was a foot ulcer, because they only have experience in foot ulcer care and no experience in foot clinics. Other common problems were numbness, loss of sensation, calluses and infected ulcers. Only one educator (20%) reported foot deformities such as flat foot, bunion, Charcot foot and claw toe.

Diabetic patients with foot ulcers and neuropathy: When educators were asked how they would manage patients with foot ulcers and neuropathy, four educators (80%) reported that they managed foot ulcers daily by means of wound dressings. Three educators (60%) reported that they advised patients to keep their feet clean. Two educators (40%) stated that an early foot ulcer should be managed at primary care centres or by the patients themselves. Two educators (40%) advised patients to avoid sharp objects and '*do foot massage in order to encourage the peripheral nerve of foot.' [E1,3]*. Additionally, one educator (20%) stated that they would advise on nail cutting, which should be straight across.

Some specific responses included:

'I advised the patients with foot ulcers to do their wound dressing, and I recommended daily self-foot examination with a mirror before showering. Don't bathe feet in warm water. Patients should use indoor and outdoor footwear.' [E1]

Meanwhile, some participants lacked experience in caring and advising for diabetic patients with numbness:

'I had only experience of caring foot ulcer. I concentrated on wound dressing and glycaemia control. In case of patients with numbness, I was never concerned and did not correct this problem. I was concerned with giving advice on footwear and checking foot sensation. I advised patients to avoid warm foot baths, to use socks and footwear inside and outside the house, to choose a style of footwear that protected the toes, and to cut toenails straight.' [E 2]

Diabetic patients with foot ulcers: When educators were asked how they would manage patients who had foot ulcers without neuropathy, three educators (60%) indicated that they would advise daily foot examinations, e.g. to keep feet clean and to dry the feet carefully after bathing. Moreover, educators advised patients who had ulcers to seek treatment from secondary or tertiary hospitals. Three educators (60%) mentioned that they would advise patients to wear shoes outside and inside the house to protect their feet. Two educators (40%) advised foot exercises and avoidance of a 'foot soak' in hot water. Only one educator (20%) suggested dressing the ulcers twice a day in primary care or on their own. Additionally, the other educators (20%) mentioned pain management. No educators stressed the importance of non-weight bearing to reduce pressure. As E1 put it

'I advised patients with foot ulcer on daily self-foot examination to use a mirror, foot exercise, avoiding sitting with crossed-legs and wearing appropriate footwear.'

Similarly, E3 reported:

'I gave advice to patients about wound dressing twice a day, seek a doctor when there is pain, red, swelling of feet, keep wound clean and increase of intake protein and vitamin C to promote would healing.'

Diabetic patients with neuropathy: When educators were asked how they would manage patients who have neuropathy without foot ulcer, three educators (60%) stated that they would advise patients to do foot exercises or foot massage in order to stimulate distal nerve function, and examine their feet for ulcers or any changes. One educator (20%) commented that patients need to manage their glycaemia control, avoid exposing their feet to sharp objects and to always wear shoes outside their home. Moreover, two

educators (40%) stated that did not advise on whether to soak feet in hot or warm water, while another educator (20%) mentioned that patients would be advised to soak their feet in warm water after testing the temperature. As E1 reported:

'*I only advised on patients with neuropathy without foot ulcer to do foot exercise and foot massage with oil or lotion.'*

While E3 stated that

'In case of patients with neuropathy, I suggested them to avoid hot or cold feet bath, avoiding hurting feet. Patients should do foot massage or exercise.'

Screening for diabetic neuropathy: When educators were asked how to screen for neuropathy; only one educator (20%) mentioned using a monofilament but did not know the procedure for doing the test. Simultaneously, another educator (20%) stated the value of interviewing for numbness history, loss of foot sensation and testing joint movement. One educator (20%) mentioned asking the patient about leg symptoms and undertaking two-point discrimination in both legs. One educator (20%) mentioned conducting a physical examination by using a needle (not recommended by NICE 2004/IWGDF 2007). The last of the five educators (20%) mentioned that they use the cotton test on patients' feet and ask them to close their eyes during the test.

'*I assessed the neuropathy status using needle at skin and asking the patients to answer the position of testing. Moreover, I asked the patients to say whether the sensation was sharp or blunt while testing with a needle.' [E4]*

Five educators (100%) stated that they had assessed patients for neuropathy but never categorised neuropathy into the four at risk levels of 'low risk', 'increased risk', 'high risk' and 'foot care emergencies' (NICE 2004). Four educators (80%) said that no structured form was available to assess patients and they did not know of any form. One educator (20%) mentioned that numbness history was assessed, whilst another educator (20%) stated that sensation testing was evaluated. One educator (20%) stated that wound assessment was made. Additionally, one educator (20%) said that joint movement was determined.

4.4 Knowledge data of nurses and educators using case scenarios.

Part of the interview data of nurses and educators, involved asking about their knowledge of foot care and foot care management. Therefore, the researcher designed two case scenarios of diabetic patients with foot problems and poor glycaemia control based on which questionnaires were developed (Appendix 2.1). Both group of nurses (n=5) and educators (n=5) were given two case scenarios regarding to patients who had diabetes and had developed foot ulcers. They were asked questions to elicit their knowledge of the disease and the interventions. Their responses have been grouped into two themes, management of the foot care in each scenario and advice given to the patients

Management of foot care is assessed in relation to the assessment of foot problems, cause of foot problems, and control of health problems in each scenario. Meanwhile, advice given to the patients focuses on the activity of self-foot care in order to promote health and well-being.

In relation to the management of both cases, the nurses and the educators demonstrated some awareness of the management of diabetes and the prevention of complications as shown in Table 5.6.

Table 5.6 Foot care management by nurses and educators in Scenario 1

Scenario 1	**Nurse** (n=5)		**Educator(n=5)**	
	N	**Percent**	**N**	**Percent**
Management of this case				
1. Foot assessment, numbness	3	60	4	80
2. Advice numbness	3	60	1	20
3. Foot care	2	40	-	-
4. Foot exercise	2	40	-	-
5. Blood serum examination	1	20	1	20
6. Observe abnormal symptom	1	20	-	-
7. Vascular assessment	1	20	1	20

8. Controlling food	1	20	1	20
9. Psychological support, release of anxiety	-	-	1	20
10. Patient education; not specific	-	-	1	20
Advice of this case				
1. Choosing footwear	5	100	1	20
2. Daily foot examination	5	100	4	80
3. Foot exercise	4	80	1	20
4. Advice to see nutritionist	2	40	-	-
5. Blood test examination	1	20	1	20
6. Observe pain, burning pain when walking	1	20	-	-
7. Glycaemia control	2	40	2	40
8. Nail cutting	2	40	-	-
9. Food control	4	80	5	100
10. Exercise	3	60	3	60
11. Observe numbness	-	-	3	60
12. Food Supplement or vitamin	-	-	1	20
13. Foot massage	-	-	1	20

In the first scenario, overall, nurses and educators showed poor knowledge of management of foot assessment and numbness, foot exercise, foot care, blood serum examination, observation of abnormal symptoms, vascular management, controlling food, psychological support, release of anxiety and patients' education. Moreover, nurses and educators also offered a variety of responses on what advice they would give to those patients to prevent foot complications.

The following compares advice from nurses and educators. All five (100%) nurse respondents indicated that they would give advice on choosing footwear and daily foot examinations while four educators (80%) mentioned daily foot examinations. One educator (20%) advised on choosing footwear and carrying out a daily foot examination. Eighty percent of nurses would advise on foot exercise, while 20% of educators suggested foot exercise to patients. Sixty percent of nurses and educators

advised on physical exercise and only 40% of nurses and educators suggested patients should maintain strict glycaemia control. Forty percent of nurses advised on nail cutting and consultation with a nutritionist, while 20% of educators advised on foot massage and intakes of supplements or vitamins. Only 20 % of nurses advised patients on observed pain and burning pain when walking and 60% of educators advised on numbness.

Similarly, all educators (100%) reported that they would suggest controlling what food the patients should eat, while 80% of nurses suggest controlling the food. Twenty percent from both groups advised on one or more blood test examination.

Table 5.7 Foot care management by nurses and educators in Scenario 2

Scenario 2	**Nurse** (n=5)		**Educator** (n=5)	
	N	**Percent**	**N**	**Percent**
Management of this case				
1. Control glycaemia	3	60	2	40
2. Foot care behaviour	3	60	1	20
3. Foot exam	5	100	2	40
4. Foot care, foot exercise	1	20	-	-
5. Consult a nutritionist	1	20	-	-
6. Behaviour evaluation	1	20	1	20
7. Wound assessment	1	20	4	80
8. Refer to Surgery	2	40	1	20
9. Blood exam investigation	1	20	-	-
10. Footwear	1	20	1	20
11. Trim calluses and off loading	2	40	-	-
12. Weight foot assessment	1	20	-	-
13. Consult medical doctor to medicine adjustment	-	-	1	20
14. Assess the problem, find out what patients need	-	0	1	20
Advice of this case				
1. Glycaemia control	4	80	3	60
2. Foot care daily	4	80	3	60

3. Appropriate footwear	5	100	3	60
4. Foot ulcer care	4	80	3	60
5. Advice to discuss with patient's scenario 1	-	-	1	20
6. Foot exercise	-	-	1	20
7. Exercise and foot massage	-	-	1	20
8. Not to walk bare-foot	-	-	1	20
9. Observe abnormal signs and follow up	-	-	1	20

In scenario 2, both nurses and educators showed poor management of glycaemia control, foot care behaviour, foot exercise, foot care, nutritionist referral, behaviour evaluation, referral to surgery, blood examination investigation, footwear, callus trimming and off-loading, foot weight assessment, consultation with medical doctor and any assessment to find out the patient's needs.

Nurses and educators also gave inconsistent advice. Slightly differently, 100% of nurses' responses indicated that they would advise on appropriate footwear and only 60% of educators suggested appropriate footwear for patients. Similarly, 80% of nurses and 60% of educators reported that they would advise on glycaemia control, daily foot care and foot ulcer care. Moreover, 20% of educators reported that they would advise patients on foot exercise, foot massage and exercise, not to walk bare-foot, and to observe abnormal signs, whereas nurses did not mention any of them at all.

5. Education

5.1 Foot care education for patients

Foot care education for patients was examined based on responses to items in the questionnaire on what nurses advise concerning foot care of patients. This topic was extracted from the theme of diabetes education (Table 5.1).

Foot care education: Fourteen patients (93.33%) received education regarding foot care from doctors and nurses which included foot washing and drying feet well between toes, daily foot examinations, application of cream, foot exercises, wearing of socks and appropriate footwear. Moreover, the participants reported that nurses and educators also

advised on blood serum examinations, daily exercises, medication for diabetes and food controlling in diabetic education. These foot education issues were included in diabetic education.

One patient (6.67%) reported that she had never received foot care education from nurses or doctors and had never had a foot exam until she developed a foot ulcer and was admitted to hospital. She was treated in the hospital after she developed the foot ulcer, which healed slowly. Furthermore, this participant felt frustrated as:

'nurses have suggested that I should eat less rice, have one orange per day and not eat dessert or iced coffee. I want to know whether nurse can do it.' [P 12]

5.1.1 Foot care practice of patients

Foot care practice of diabetic patients was extracted from a theme of daily foot care. Participants explained their foot care activity and reasons for lack of their foot care.

Eleven patients (73.33%) indicated that they washed, dried and checked their feet. Four patients (26.67%) reported that they did not check their feet. Some participants reported that they never applied any lotions to their feet. One participant (6.67%) washed her feet in warm water regularly. Two patients mentioned that they cut their nails by themselves or with help from family members. Some patients stated

'never washing feet, though nurse advised. Later, after skin cracking I am interested in washing and foot care because I read the leaflet regarding foot care at hospital's board.' [P 7]

Participants who did the practice foot care were still blamed by health care providers for not following foot care properly.

'*Nurse advised on foot care at home and I understood but in practice I was unable to do it all. Nurse suggested to wash feet three times a day. I examined foot with a mirror and washed feet every day. When I went to see the doctor, health care provider blamed the dirty foot, although I did washed my feet every day. I thought that soil at home made the feet dirty.' [P1]*

Participants did indeed follow some, if not all foot care advice.

'At home I did brush nails and feet, soap washing and drying the feet but did not examine or moisturise my feet.' [P 2]

'I did mix the hot and cold water together and did a warm foot bath. Sometimes, I mixed vinegar in warm water for warm footbath. It made my foot clean. My husband examined my feet every day. I still wear the sandals.' [P 4]

'Nurses advised on foot washing. I had never done the first time. After my feet had started cracking and itching. I was concerned about the foot problem and started washing and following much more foot care. I read more about foot care in the hospital's brochure.' [P 7]

Seven patients (46.67%) indicated that they were concerned about their diet. Nine patients (60%) reported having problems with managing their food and glycaemia control. Nine patients (60%) cared for themselves, including cooking and one participant mentioned the problem of food control:

'Nobody suggested how much rice they can eat. Doctors did not say how they must act to reduce sugar or what I should do to reduce the sugar. I did not understand how to reduce sugar. In addition, nurse said stop eating sweet things. Do not eat rice a lot; you should eat only one ladle. Do not exercise because of heart disease.' [P12]

In addition, patient appeared to have good social support from her family and a good knowledge of diabetes. One patient stated that she:

' had a daughter who is a nurse and she bought a pressure monitor and blood monitoring machine. I controlled food: eat vegetable, fruit, fish with small portion rice and test blood before meal. I found that when I exercise, the blood glucose level is not high. If I ate but did not exercise, blood glucose would be high level. So I exercise every day by cycling half hour per day. After exercises, I feel fresh and all symptoms better. I wear the shoe with stab belt. I feel it is good for me. The shoe is soft.' [P 10]

Regarding footwear behaviour, four patients (26.67%) reported having appropriate footwear inside and outside the home. Six patients (40 %) indicated that they wore only a rubber toe tough flip flop. Four patients (26.67%) wore appropriate footwear (sport shoes, leather slippers) when seeing a doctor and of these, of these four, three patients (20%) reported that they wore sandals at home. One patient (6.67%) mentioned sometimes walking barefoot outside. Furthermore, participants mentioned the nurse's advice and practice in daily life. Some participants were unable to follow the advice with regards to wearing appropriated footwear and doing self-foot examinations.

'*Nurse suggested wearing the appropriate shoes. I was concerned and wore the shoes inside home. An appropriated shoe costs 4,000 baht. It is expensive. I was unable to buy this.' [P 1]*

'Nurses advised on wearing socks and sports shoes. When I was at home, I did not wear sports shoes inside or outside home. When I saw the doctor or went to the market, I wore socks and sports shoes. Normally, I wear sandals and I had thick nails. I did not wash my feet and do foot examination every day. Sometimes, I did brush, wash, dry and moisturise the feet.' [P 8]

Some of participants who had abnormal feet (Figure 5.1, participant 1, with a deformity like the Charcot foot) explained that

'*I had abnormal feet for a long time. A doctor or nurse did not suggest doing surgery. They suggested on wearing sport footwear. I wear sports shoes and wear socks outside and inside home and would take off shoes at night.' [P 9]*

Besides, one participant explained that:

'Appropriate footwear would be worn on meeting a doctor because nurse advised it. When staying at home, I would wear sandals and wear socks sometimes because of my occupation. I don't wear shoes inside home and the floor at home is concrete. Washing feet was never performed and self-foot exam was not done every day. I prefer to wear sandals, sometimes wear socks and polish with brush. I don't cut nail by myself. I had thick nails and dirty feet.' [P 8]

‘When I saw a doctor, I wear sports shoes. Sandals were worn at home and I wear socks sometimes.’ [P 6]

However, the semi structured interview yielded data on complaints about the health care service from the patient’s participants, which are reported in the following examples.

Being diagnosed with diabetes was a life-changing moment for participants, with a great amount of diabetic care to take in, especially regarding food behaviour that it is difficult to practice. Participants were not encouraged by health care providers.

‘I had diabetes for a long time. When I went to the secondary hospital to check the blood sugar level, very high blood sugar was found. Nurses said that I did the wrong thing and suggested that I should stop drinking coffee and eat a small amount of rice, only 1 ladle (In Thailand they use the ladle to show the amount of rice). I wonder whether the nurse can stop drinking coffee or eating a small amount of rice.’ [P 12]

‘Nobody told the amount of food per meal. The doctor did not tell how to reduce the blood sugar and what to practice for reducing blood sugar. Moreover, I do not understand how to reduce blood sugar. Health care providers told me only to stop eating so sweet food, stop eating too much rice and stop exercising.’ [P 5]

As highlighted by a few responders, it was thought there was a problem with the hospital service system and so they decided to abandon the service.

‘I did not like to see the doctor because of the delay of service at government hospital and a long queue to see the doctor. Regarding foot care education, I had never learnt how to do self-foot care or diabetic management from nurses or any health care providers.’ [P12]

‘Normally my foot’s skin was good. When I had an ulcer, the wound was fast to heal. This time, I had a foot ulcer, went to the primary health care unit, and got daily dressing for a month. After that, the foot ulcer was not healing and I was referred to the secondary hospital. I received the dressing for two days. I felt that nurses in secondary hospital did not do the best dressing, blamed me about food eating, and suggested to

stop drinking coffee. I decided to go to the tertiary hospital and got the admission later that day.' [P12]

Another participant complained of the inconsistency of knowledge of diabetic care of health care providers.

'I learned and practice how to do foot care. When I learn how to exercise, each nurse did not teach the same content or the same detail.' [P7]

Often there was concern about foot problems from the diabetic patients' perspective; participants did not understand foot care practice. One participant mentioned that:

'I received foot assessment by a nurse and had a normal result. I did not know the reason for the foot examination. Nurses did not explain the reasons for foot assessment.' [P 11]

While participants tried to control their meal, they still did not understand to eat large amount of fruit. One participant mentioned that:

'I followed up the doctor's advice and ate the fruit such as eight pieces of water melon. I ate many kinds of fruits. But I still got the high blood level and had dim eyesight. I never knew the proper amount of fruit for my disease. The doctor had never told me about this issue.' [P 15]

Patients also mentioned being ignored by health care providers.

'I felt burning and both legs were painful all day, all night, for 10 years. I had complained to doctors but they were not interested in this symptom and gave no treatment.' [P 9]

Moreover, participants complained about the side effects of the medicine to the doctor and some of the doctor did not show concern regarding such complaints, or of any symptoms such as nausea and vomiting. This showed the awful care, which patients received as, mentioned that:

'I went to the secondary hospital to receive the diabetes treatment. I got the medicine two tabs in the morning and the evening. After taking the medicine, I had nausea, vomiting, flushing of face and skin, and felt dizzy. I decided to consult a nurse in primary care setting. They suggested I reduce the dose of medicine. My symptoms got better. Then, I saw the doctor at the secondary hospital and I complained about my bad dose of diabetes treatment. Doctors changed the medicine in that time. After I took the new one, I had nausea, vomiting, dizziness and loss of appetite. I then went to complain at the primary care setting. They suggested reducing the dose of medicine. I had a much worse dose of medicine. My fasting blood glucose was still high level (397 mg/dl). A doctor and a nurse blamed me for the high level of blood glucose and changed the medicine again. I still got nausea and vomiting.' [P 12]

5.2 Foot care advice given by nurses

Five items were used to assess what advice nurses gave to diabetic patients regarding foot care. Four nurses (80%) advised appropriate footwear. Additionally, patients were advised not to walk barefoot and to wear shoes at all times. The last nurse (20%) stated that she would advise patients to wear shoes outside and inside the home. Regarding nail cutting, only two nurses (40%) advised to cut nails straight across. One nurse (20%) gave advice on trimming calluses with a brush. One nurse (20%) stated that patients with a foot ulcer would be advised on wound care.

Nurses' perceptions of foot management in diabetes patients: Nurses were asked whether patients managed daily foot examinations. Two nurses (40%) suggested that patients could manage foot care and examination daily, while four nurses (80%) thought that patients could not change behaviours such as wearing inappropriate shoes, failing to keep feet clean and cutting nails. Nurses reported that the main reason for lack of concordance was financial.

Nurses' awareness of current foot care protocol: When nurses were asked to describe the current foot care guidelines and whether they used any foot care guidelines, the overall response (100%, n=5) was negative. Participants suggested that they perform

certain activities such as assessment, referral, inspection and advice on the reduction of foot ulcers.

Assessment of risk: All five nurses (100%) stated that they examined the affected foot annually by monofilament testing and palpation. They all reported that any patient having a history of foot ulcers was assessed. All five nurses (100%) stated that wound assessment would be performed using the Wagner system/University of Texas tool and two nurses (40%) stated that a referral system was in place for patients who had foot ulcers. One nurse (20%) used the Doppler to assess the patient's vascular status and another nurse (20%) did the ABPI test (Ankle–Brachial Pressure Index testing) by taking the blood pressure at the arm and ankle and comparing the ratio. Two nurses (40%) stated that joint movement would be assessed in each patient. After assessment, only one nurse (20%) classified patients according to the risk group. The nurses (100%) did not explain the result of foot assessment to their patients. Five nurses (100%) stated that patients were subject to a foot examination once a year but this was not followed up by categorising those patients into risk groups.

Regarding patients' referral, all five nurses (100%) stated that patients with a foot ulcer would be referred to get a dressing and be examined by a doctor in severe cases. One nurse (20%) reported that the patients with vascular abnormalities would be referred to a surgeon, while the other nurse (20%) stated that patients with foot deformities would be referred to the physiotherapist for special shoes. In case of a callus that is the risk of foot ulcer, only one nurse (20%) indicated that she would trim a callus while another nurse (20%) advised patients to polish the callus with a brush. Other nurses (60%) did not mention how to remove calluses at all.

The nurse's perceptions of current foot care protocol showed misunderstanding or lack of knowledge of an existing clinical practice guideline from Thailand, produced in 2007. Nurses commented:

'I thought that there is no clearly guideline or document of guideline.' [N1]

'There is no foot care guideline to classify risks or identify the treatment or intensive care in diabetic patients with foot complication. No guideline of classified foot risk in

diabetic patients was used in the clinic. There is only policy from the hospital on foot assessment annually in diabetic patients.' [N2]

Regarding documentation using a standardised form, nurses complained about the items which were recorded.

'In case of foot ulcer record, there is a yes or no item of foot ulcer and no item to record ulcer characteristics. A year later, I am still not sure (of the presence) of the previous or new foot ulcers because there were no added details. I had to confirm with the patients again.' [N 3]

Nurses' perceptions of the effectiveness of the current protocol: When asked, all five nurses (100%) stated that there was no document outlining or explaining foot care guidelines in their hospital. Two nurses (40%) stated that patients with neuropathy would not be referred to correct the problem. One nurse (20%) reported that patients with an abnormal Doppler test would not be referred to a vascular doctor, while three nurses (60%) reported that a patient's vascular problem would not be referred to vascular doctors as well. Three nurses (60%) stated that patients would not be investigated with the ABPI test.

In contrast, one nurse mentioned the problem of using a monofilament in that she was not confident with the method of using it, such as deciding on the degree of bending of the monofilament or its accuracy. Another nurse (20%) stated lack of confidence with the procedure of palpation and evaluation.

'*Sometimes, I did not know how to evaluate a strong pulse or regular pulse. I may do palpation in the wrong position. I cannot classify between strong and light palpation.' [N 1]*

'Regarding palpation, I was not confident in classifying palpated pulse, palpable position, and the accuracy of palpation in the feet. Sometimes, the pulse is strongly or light.' [N3]

'I am not assured of monofilament testing regarding the procedure and the result of monofilament testing.' [N 3]

Furthermore, the nurses mentioned the problem of Doppler testing was that the budget of the hospital was insufficient to buy the machine. One nurse (20%) stated that she had no knowledge of using Doppler. Moreover, one nurse (20%) mentioned that she used the Doppler to test the vascular status of the patients but she was not confident in recording and evaluating including the accuracy of testing.

On the issue of referral, one nurse (20%) mentioned that patients who had vascular problems were not referred to a vascular surgeon because in this hospital she has never had the experience of coordinating such problems.

To the highlight of poor professional judgement, nurse participants complained of inappropriate behaviours of diabetic patients, although nurses provided the foot care education. It showed that they are in doubt of the outcomes of foot assessment and foot education.

'I thought that foot assessment was useful and would prevent diabetic foot complication. Thailand's diabetic patients were not interested in foot care. They are worried only about their faces but not feet. So, I said that the foot is important and they must care for it. I had experience with patients with foot complications. Individual shoes are moulded for patients but they did not wear the special shoes.' [N2]

'I advised diabetic patients on appropriated footwear such as sports shoes. Most of the patients were still wearing sandals. Moreover, some patients complained that they were not familiar with sports shoes because of lack of ventilation. When I suggested the mould shoes, patients refused to buy them because of the high prices.' [N3]

By contrast, some nurse participants mentioned their role in foot education and the positive behaviour of patients who asked for foot care education.

***'**I provided foot care education. In case of foot ulcers, wound care was provided in diabetic patients. I suggested wearing appropriate footwear all day, all night for patients with numbness of feet, and taking shoes off only at bedtime. In case of foot deformities with a claw toe or bunion, I consulted and referred to physical therapists to mould special footwear. When patients went back to foot clinic, I evaluated the*

effectiveness of mould shoes. Patients said that the shoes were good. I found that some patients walked in the foot clinic to ask what t type of footwear to get for numbness. I showed types of footwear (in Figure 5.3) and suggested to buy them.' [N2]

5.3 Foot care advice given by educators

The same five items used to assess nurses' advice were used to evaluate those of educators. Educators were asked about the foot care advice and foot care education that they gave diabetic patients The findings showed that one educator (20%) advised a foot examination and to consult a doctor on finding abnormal symptoms. Another educator (20%) advised patients to wear toe and heel covering shoes and to avoid a 'foot soak' in warm water if there was loss of sensation. In case of foot ulcers, wound care and glycaemia control were advised. However, two educators (40%) said they had not advised these treatments.

Daily foot care that educators teach diabetic patients: Four educators (80%) advised on a daily examination of feet and washing. Three educators (60%) suggested wearing appropriate footwear and to keep wearing shoes inside and outside the house. Two educators (40%) suggested advising foot exercise and glycaemia control. One educator (20%) advised foot massage, wound assessment, and no 'foot soak' in hot water.

Regarding wound care practice, educators provided wound care knowledge which highlighted general wound care, without focusing on diabetic wounds.

'I advised diabetic patients to keep wounds clean to prevent the infection, not to wear ill-fitting footwear, exercise feet and foot massage to promote peripheral blood circulation, and moisturise foot with cream or lotion.' [E3]

The educators concerned the suitable footwear for diabetic patients need only cover the toes, but the educator provided general information.

'I gave advice about examining foot ulcers, foot numbness, loss of sensation and calluses, selecting footwear which covered the toes, avoiding injury to the feet, washing

feet and foot massage to promote blood circulation at toe, moistening foot with cream or lotion every day, and controlling blood sugar.' [E4]

Educators' perceptions of foot management in diabetes patients: Three educators (60%) believed that patients could manage their feet independently. One educator (20%) stated that patients were unable to care this care had to be undertaken by the health care providers and when an ulcer was present, they would visit the doctor. Educators stated that poor foot care could result from eyesight problems in the elderly, lack of caregiver support and being in a difficult financial situation.

Educators' awareness of current foot care protocol: Four educators (80%) stated that no protocol was in use, although there was the diabetic guideline of Thailand, version 2007 and diabetic foot care is included there. Two educators (40%) stated that foot and wound assessment would be done by educators. . Three educators 60%) stated that foot care and washing would be advised by educators. One educator (20%) stated that patients would be advised on foot massage, footwear outside the house, foot exercises, and medicine and food control. As the highlighted by the educators, most participants were not aware of the current guidelines and only gave advice relating to wound management.

'Regarding foot care guideline, I was concerned the foot care as I knew that, no foot care guideline was used in practice. I provided the symptomatic treatment for diabetic foot ulcer and gave advice for foot care. The concept of foot care included preventing increasing numbness, avoiding eating instant food, taking diabetic medicine regularly, doing foot exam and foot massage twice a day in morning and in evening, and seeing the doctor.' [E4]

Educators' perceptions of the effectiveness of the current protocol: Two educators (40%) stated that the protocol, which is the existing manual of hospital, did not work and that limb amputation was still an issue. One educator (20%) said that the protocol resulted in good glycaemia control. Two educators (40%) stated that the protocol raised patient and caregiver awareness.

'I thought that the protocol sometimes is effective, depending on awareness of patients and caregivers.' [E5]

6. Discussion of the qualitative results

The main focus of this research was to develop a foot care guideline for diabetic patients. As part of this study, the research explored current practice for foot care with diabetic patients in Thailand, using a qualitative descriptive approach. The findings have been presented in the previous sections of this chapter.

In this discussion section, the findings will be examined in relation to the overall aim of developing a foot care guidelines that are both pragmatic and effective. The section provides discussions following the research questions and the aim of this study, which consist of two parts. The discussion of the current and best foot care practice for diabetic patients in Thailand was shown in the following five themes: 1) Patients' knowledge, 2) Education and foot care practices, 3) Nurses' knowledge and education, 4) Nurses practice, educator knowledge and education, and 5) Educator practice.

6.1 Patients' knowledge, education and foot care practices

The findings in section 4.1 and 5.1, demonstrated that diabetic patients had some knowledge of their condition. Although their comprehension of the disease process was limited, most of the patients had limited knowledge of the complications associated with diabetes, such as foot ulcers, nephropathy, hypertension, high cholesterol, heart disease, retinopathy and strokes. These findings are supported by previous studies of Pollock et al. (2004), Khamseh et al. (2007), Naicker et al. 2009, and Hasnain and Skeikh (2009). Pollock et al. (2004) found that half of all patients were unaware of the effects of smoking and performing good foot hygiene. Some patients performed undesirable practices such as walking barefoot, using direct heat on their feet, adding irritants into water used for washing feet and incorrectly trimming toenails. In addition, only 16.2% of all patients purchased current appropriate shoes and measured their feet in order to avoid ill-fitting footwear. Furthermore, earlier studies in Thailand have also

confirmed that diabetic patients with foot ulcers understood less about self-foot care practices than those without foot ulcers (Sriussadapron et al. 1998). However, Hajos et al. (2010) reported that diabetic patients perceived diabetes as a serious disease and were worried about the complications.

All the patients reported receiving some form of education for the prevention of foot ulcers. They reported that nurses and doctors had advised them on correct the foot care practices and diabetic care but whilst some participants followed the advice, others did not do so. Patients explained the difficulties in self-management, in particular difficulties in effectively managing their diet and glycaemia control. The finding showed that patients suffering from hypoglycaemia and poor eyesight believed that these side effects were caused by insulin. Therefore, they stopped taking insulin and used self-prescribed complementary medication (special tea and Thai herbs) (Section 5.1). Similarly, the finding of Gale's study indicated that some patients decided to ignore advice (Gale et al. 2008).

This finding showed that most patients with a long duration of diabetes had developed neuropathy and foot complications, a conclusion supported by the earlier research of Oguejiofor et al. (2010) who found that a long duration of diabetes caused peripheral neuropathy and was a risk factor for foot complications. Patients experiencing duration of diabetes lasting more than 10 years usually had peripheral neuropathy and were identified as a high-risk group for foot ulcers (Boulton 1998). Patients (Section 4.1), who had diabetes but had not developed any complications reported that they were not concerned with foot complications developing later and were unaware of foot problems and glycaemia control. Additionally, this finding showed that patients had poor management of their diabetic illness, including daily foot care. It seemed that their weakened physical ability and their poor eyesight caused inadequate foot care and disease management. This conclusion is similar to that of Aalaa et al. (2012) who found that it is difficult for patients with limited vision to examine their feet.

This study showed that patients were unconcerned about possible foot complications or any complications, although they had some knowledge of diabetes and its problems. This finding is similar to those of Aliasgharpour and Nayeri (2012), Desalu et al.

(2011), and Pollock et al. (2004) who indicated that some patients were unaware about the development of disease. The data showed that patients were unaware of their risk of foot ulcers and other explicit symptoms of foot complications, similar to the finding of Gale et al. (2008), because they had insufficient information about nutrition and diet; particularly lacking was concern about normal blood glucose levels.

The findings in this current study also indicated that although patients were aware of the complications of foot ulcers associated with diabetes, they did not follow a comprehensive and regularly structured approach to foot care. For example, (Section 5.1), patients would wash and dry their feet, but some of them would not wear appropriate footwear inside or outside the home; nor would they examine their feet daily for redness, ulcers, change in colour etc. This finding was consistent with previous evidence showing that patients put little effort into foot care; for example forgetting to wipe their feet with surgical spirit rather than just washing their feet (Gale et al. 2008). It seems possible that patients who performed adequate self-foot care had not attended a self-care education programme (Pollock et al. 2004).

Furthermore, there is evidence of inconsistent foot care behaviour relating to the wearing of shoes. Some patients, who had suitable shoes when visiting the doctor, reported wearing inappropriate shoes at home. The reason for wearing inappropriate shoes in Thai culture is that patients prefer sandals as footwear, which is suitable for the hot weather, appropriate for those with financial constraints and in informal occupations (Sriussadaporn et al. 1997). In general, patients also did not wear shoes in the house, to conform to Thai culture, and this creates a dilemma for both patients and health care professionals. Shoes are considered to be ‘dirty’ and not to be worn inside the house for many Asian societies, including the Thai people. Barefoot walking in diabetic patients, was also reported by Sriussadaporn et al. (1997), Pollock et al. (2004), Abbas and Morbach (2005), Kurniawan and Petpichetchian (2011), and Rerkesem (2011). Abbas and Morbach (2005) stated that walking barefoot, both inside and outside the house, was a habit in developing countries, and that preventing accidentally damage to the skin was not considered a priority (Gale et al. 2008). Rerkasem (2011) reported that the 55.4% of the research population were likely to walk barefoot inside the house and this was closely linked with accepted Thai sociocultural practices, similar to the conclusions

reached by Khamseh et al. (2007). This research has shown that patients should be encouraged to keep a pair of appropriate shoes solely for indoor use. This will address the issue of 'dirty shoes' inside the house but the educator must also review the additional psycho-social pressures that may require addressing in order to achieve greater concordance.

The findings from this current study similarly showed that most patients had received education on the management of their diabetes. However, this education had been provided only during attendance at the clinic, where a leaflet about the condition had been given to them. The historical data suggests that all the patients attending the clinic were at high risk of developing foot complications. Patient education also depended on the staff providing that education. The current style of patient education is medically centred, with nurses explaining foot care knowledge and how patients can take care of their feet. This research has shown inadequacies in this, the patients showed that they did not know the reason for their foot examination, nor did they know the result of their foot examination after each test. It appears that there is a lack of a strategy to ensure all patients receive a comprehensive education such as the DAFNE/DESMOND model of education from the UK. Furthermore, the findings of Schmidt et al. (2008) showed that patients who attended an educational programme more than three times performed the best self-foot care. Perhaps because of this, some patients complained in this study about foot education. This is similar to Gale et al. (2008), who indicated that patients were dissatisfied with the received health care advice and information related to foot health.

The current findings showed that patients accepted diabetes to be a chronic illness (Section 4.1) but did not change their health care behaviour because they had very limited, and in some cases, inaccurate information. There is strong evidence that education could effectively improve patients' foot knowledge and behaviour (McMurray et al. 2002, Corbett 2003, Valk et al. 2005, Pollock et al. 2004, Hasnain and Sheikh 2009, and Vatankhah et al. 2009). Therefore, patient education should form the cornerstone of diabetes management, so that patients can take responsibility for the management of their disease. There is evidence illustrating that patients who received foot care education had significantly more foot care knowledge than those who did not

receive such education (Johnson et al. 2005, Schmidt et al. 2008). However, Retting (1986) found that knowledge was not the only important issue. This research conducted a randomised study to assess effectiveness of a home diabetes education programme. Four hundred and seventy one diabetic patients were recruited: a control group of 243 and 228 in the intervention group. The findings showed only slight differences of self-care skills between the control group and education group, whereas knowledge scores were significantly different between the two groups. It seemed that education alone was ineffective as a means of inducing self-care behaviour (Naicker et al. 2009, Retting 1986).

Some patients received the foot care education but not practice foot care daily, resulting in some patients experiencing poor self-foot care. Education seems to exert a short-team positive impact on foot care behaviour (Perrin and Swerissen 2008). Patient education should integrate the components of diabetic care with the effective process of implementing educational programmes (Retting 1986). Williams and Bond (2002) suggested that people with poor self-care had a low level of self-efficacy. Thus, self-efficacy may well promote appropriate self-behaviour concerning the issues of diet, exercise and blood glucose testing (Williams and Bond 2002).This finding suggested that the best style of patient education was individual, face-to-face with a nurse providing the knowledge of foot care and diabetes at the first time of diagnosis. However, this was not effective in promoting self-foot care behaviour because patients received too much information at one time and consequently forget that advice (Johnson et al. 2005). Similarly, the study of Aliasgharpour and Nayeri (2012) showed that patients did not pay attention to the health care provider. Foot care education should therefore adapt in the light of this empirical evidence. It is therefore suggested that foot care education should be provided regularly and reinforced by the MDT, including the adoption of a structure programme in order to ensure the consistency of foot care information (Rensburg 2009). The mixed style of patient education, with continued support, should be the education model for diabetic patients (Calle-Pascual et al.2002, Corbett 2003, Perrin and Swerissen 2008, Valk et al. 2005).

The findings relating to diabetic patients with foot ulcers showed that they experienced anxiety about their symptoms and treatment. In addition, they indicated that nurses and

doctors did not allow freedom for patients to express their feelings about their symptoms or suffering caused by their treatment. These findings were supported by Watson-Miller (2006) who also found similar feelings of anxiety or worry in diabetic patients with ulcers, particularly a fear of foot amputation. It is believed by Watson–Miller (2006) that the emotional problem was made worse as a result of the health care team overlooking what emotions the patients were experiencing. Similarly, the findings of Akca and Cinar (2008) showed that patients with poor psychosocial adjustment were associated with poor metabolic control. In particular, diabetic patients with foot ulcers had more adjustment problems regarding their social environments, vocational environments, health care orientation and domestic environment (Akca and Cinar 2008, Perrin and Swerissen 2008). In addition, patients who faced repeated problems, such as neuropathy and foot ulcer, had a decreased quality of life and depression (Perrin and Swerissen 2008). This psychosocial problem is an associated factor relevant to foot care behaviour, requiring monitoring and protective action, proposed by Perrin and Swerissen (2008). They also suggest that promoting foot care and self-efficacy should provide positive consequences. For example, it should provide praise or highlight the successful behaviour of another patient, including making the value of good health quite clear, this is supported by this research.

The findings indicated that all patients who had a history of foot ulcer received a foot examination annually. It is notable that all at-risk groups of diabetic patients received foot examination once time every year. However, this frequency is ineffective for a high risk group whose members have foot ulcer or foot deformities. Also, the findings showed that some patients did not know the result of their foot examination or the reason for their foot examination. This finding is the same as the study of Gale et al. (2008) which showed that the patients reported their misinterpretation of explanations or feedback from their health care providers.

However, it should be noted this study has also found ideal foot care behaviour from patients, similar to Gale et al. (2008). The findings showed that some patients reported excellent standards of foot care behaviour such as daily foot washing, exercise, good control glycaemia, and wearing appropriate shoe. Those patients mentioned that they received foot care information and strong support from family members, such as a

daughter. This conclusion is mirrored by De Berardis et al. (2005) and Perrin and Swerissen (2008), who reported that patients who were supported by their family showed the best foot care behaviour. On the other hand, patients with low family support were less likely to maintain their foot care behaviour regularly. Some patients felt that they can do good foot care because they joined a diabetic education camp. In this present study, a similar phenomenon was observed in the study of Kurniawan and Petpichetchian (2011). As a result, the patients had discussed their condition and sorted out the available sources needed to solve their problems. It appears that support from health care providers, caregivers and family are important factors when needing to promote appropriate foot care behaviour for diabetic patients.

6.2 Nurse's knowledge and education

The interview and case studies data (Table 5.6) suggest that some nurses had sufficient knowledge of diabetes and the complications associated with hyperglycaemia. Nurses were confident about carrying out foot examinations and had sufficient knowledge to educate patients on their conditions and the prevention of complications. However, some of the nurses lacked knowledge of advanced practice and use of best practice based on current evidence. It is evident that the lack of knowledge shown by the health care providers related to the standards of effective or ineffective implementation of patient education (Aalaa et al. 2012). The current system does not require medical / nursing staff to demonstrate knowledge or competency beyond their initial qualification stage. Furthermore, there are no formal professional development courses for nurses working in the area of diabetes.

6.2.1 Nurses' practice

The findings suggest that nurses did not follow any recommended national guidelines in the assessment and management of foot care in diabetic patients. Instead, they adhered to their local policy for managing diabetic patients, which varied in practice from nurse

to nurse. Their practice of using the monofilament for assessing neuropathy was inconsistent with current guidelines recommended by IWGDF (2007). Meanwhile, a systematic review by Dros et al. (2009) on the accuracy of monofilament testing to diagnose peripheral neuropathy concluded that the monofilament should not be used as the sole method of diagnosing peripheral neuropathy. The ADA (2008) recommended that the diagnosis of peripheral neuropathy should only be made after a careful clinical examination with more than one test: for example using vibration perception (by employing a 128-Hz tuning fork), pressure sensation (using a 10 G monofilament at least at the distal hallux), ankle reflexes, and pinprick.

When in doubt, a nerve conduction test might be necessary to establish a firm diagnosis. Therefore, patients with any loss of sensation identified by the monofilament test must be reassessed using other modalities and patients should be referred to specialist doctors for confirmation of the diagnosis of peripheral neuropathy. Aalaa et al. (2012) argued that monitoring and treatment of peripheral vascular disease is the main duty of nurses in both the foot clinic and home. Therefore it is important for nurse to assess the status of their peripheral vascular disease.

It is evident that the nurse role in diabetic foot care should not be confined just to foot examination and wound dressing (Seaman 2005), but also involves encouraging patients and their families to undertake appropriate care and regular follow up (Bielby 2006, Fletcher 2006). The role of identifying risk factors and the methods of reducing risk factors is the main goal of screening (Yetzer 2004). Regarding the screening for foot problems in this current study, nurses provided foot examinations for diabetic patients at least every 12 months. Patients received foot education, when visiting the diabetic foot clinic. This is similar to the findings of De Berardis et al. (2005). Similarly, Aalaa et al. (2012) suggested that one of the nurse's roles in diabetic foot care should be to teach patients to take daily care of their feet. In additional, nurses should encourage patients to continue to follow simple rules to prevent foot ulcers and/or their recurrence (Aalaa et al. 2012).

It can be argued that the patient education provided by nurses and doctors did not focus on the self-efficacy of diabetic patients. Nurses gave advice on daily foot care, foot

washing, and appropriate footwear and foot examinations. However, they did not ask about the problems that patients were faced with in carrying out foot care, nor did they enquire into patients readiness to change their behaviours. This problem was confirmed by reporting of patients (Section 4.2) that they were not allowed to express their problems or any feelings/emotions related to drug treatment, foot symptoms, nor any difficulties with their diabetic management. The similar findings of Flood (2009) showed that nurses had low scores for emotional support of patients in diabetic foot care. In addition, the study of Adolfsson el al. (2008) found that nurses and physicians knew their roles in the traditional medical context and did not become involved or take on a patient empowerment role. Nurses' roles were not changed from expert to facilitator; the traditional nurses provided education and acted as 'the expert' who gave advice and recommendations that they expected the patients required in order to facilitate their self-management.

Moreover, the amount of patient education received influenced patients' behaviours to a greater or lesser degree. There is evidence to suggest that patient's foot care education is effective in the prevention of diabetic foot ulcer (Aalaa et al. 2012). Chuepan (2010) mentioned that patients who received foot care knowledge five times per year demonstrated good behaviour relating to their foot care. By contrast, the interview findings in this study showed that patients only received foot care education and foot examination once per year and the risks of developing foot complications were not classified using any of the recommended systems, such as those suggested by ADA (2008), NICE (2004) or IWGDF (2007). The finding was similar to the previous study of De Berardis et al. (2005) that diabetic patients were not offered adequate education of foot care. Therefore, patients may lack appropriate foot care treatment; this may indeed cause development of further foot complications and, in extreme cases, foot amputation. Patient education should be provided more frequently than at the first time diagnosis and that the frequency of encouraging family support should be increased.

If risk groups could be identified by following a guideline, then the management of diabetic patients would become more individualised and possibly more effective. Patients at little risk could be seen by health care professionals less frequently, compared to those who are at high risk and requiring more frequent clinic visits. This

idea is supported by the study of Fujiwara et al. (2011) that assessed the effectiveness of a preventive foot care nursing programme, based on the IWGDF (2007). Eighty-eight diabetic patients were recruited during the two year study. Patients were examined for foot problems and categorised into four risk groups after which they received the foot care appropriate for each category. The result of this study showed that the changing severity of foot problems, such as tinea pedis and grading of callus, were improved.

The current finding also showed that nurses were more concerned with the problem of patients' footwear but failed to focus on patient encouragement; that is their affective wellbeing. The style of patient education was not patient centred; the nurses gave the same information to all the patients in the same way and never assessed the strength of the patient's problems or needs. The finding showed that nurses provided foot care education when undertaking a patient's foot examination and commonly adhered to examining the feet of diabetic patients, forgetting to explain the result of the foot examination. This omission included overlooking the need to refer any high risk patients to the specialist foot care team. The advice given was also unstructured and different from nurse to nurse and patient to patient. Foot care education was not treated separately. These findings therefore support the development of a foot care guidelines for the assessment and management of diabetes patients to ensure that practice is evidence based and that all patients receive the right education, advice, referral and treatment.

In additional, the current finding showed that, although patients received foot care education, most were poor performers at self-foot care or diabetes management. The nurses in this study were concerned about foot complications in diabetic patients and provided information of daily foot care. Some nurses mentioned that patients deny having received advice or often appear to have forgotten relevant advice given to them. This finding is in agreement with the study by Johnson et al. (2005) which showed that both patients and health care providers indicated the importance of special advice and explanation early in the course of diabetes and its treatment. Patients tend to reject disease information and advice when first diagnosed because of their stage of initial shock. This stage may limit the patient absorbing information about foot care management as their cognition is temporarily impeded by their anxieties. It is possible

therefore that the advice relating to lifestyle changes, such as dietary restriction, smoking cessation, exercise and daily foot care simply 'did not register'. What's more, lack of encouragement or empowerment by nurses and doctors caused patients to experience stress and anxiety when seeing and/or meeting the nurse or doctor (Ismail et al. 2003, Perrin and Swerissen 2008).

The findings of this study showed a lack of attention from both nurses and patients. Nurses believed that patients were not attending to their foot care and nor were they paying attention during receiving foot care education. Similarly, the finding of Aliasgharpour and Nayeri (2012) indicated that there is inattention from health care providers in training and also a lack of patients' attention towards training so that some patients did not received due attention from the therapeutic team. However, nurses believed that the best foot care education should be provided to diabetic patients and all patients should undertake daily foot care. Some nurses, however, forget to assess the financial problems and lifestyles of patients. It seemed that interaction between nurses and patients was inadequate, a barrier resulting from unreceptive patients, lack of time and high patient load (Flood 2009, Ritchie and Prentice 2011). Meanwhile, diabetic patients expected to receive foot education and the best practice from nurses and doctors. Many patients were faced with challenging issues such as financial limitation, lack of suitable caregivers, and physical problems such as poor eyesight. These findings are similar to those of Aalaa et al. (2012), who suggested that knowledge of nurses in the fields of dressing and awareness need to be improved to promote excellent diabetic foot care, such as selecting an appropriate dressing (Aalaa et al. 2012).

In summary, these findings showed that nurses provided foot examination and foot education for diabetic patients on an annual basis. This is similar to De Berardis et al.(2005) who found that patients received foot education and had examined their feet at least once a year were significantly more likely to examine their feet relate to self-foot care. In this study, advanced foot care practice such as diagnosing neuropathic problems was not provided by nurses. Most nurses provided foot examination as part of a monofilament test and assessment of neuropathy symptoms. Some nurses did not refer the patients in high risk groups of vascular or neuropathy problem and neither did they treat problems such as trimming calluses or re-examining feet every three months.

Although there is the national diabetic guideline from 2007, the nurses only provided the role of practitioner of foot examination and provided limited foot education. The role of nurse facilitator was not illustrated, due to a result of lack knowledge and lack of concern of the complications; nurses stressed they had no time to do this. There are inconsistencies in the standard education and standard of foot examination covering foot care practice.

6.3 Educator's knowledge and education

Five educators were interviewed who worked as lecturers/instructors in a nursing college, who taught theory and diabetes nursing care principles and worked with students in wards relating to diabetes. Educators worked on the wards to supervise students relating the diabetes to wound surgery and the medical department during the semester period. The evidence from the interview data and case studies (Tables 5.6 and 5.7) regarding educators' knowledge of diabetes and diabetes foot care indicates that educators did not have sufficient knowledge of diabetic foot care, had poor understanding of foot assessment, and lacked awareness of current practice, or available local or national protocols for managing diabetic foot care.

6.3.1 Educators' competence in practice

The findings from the interview and case study data suggest that educators' knowledge of the practical management of diabetic patients in the wards was insufficient to provide an optimum level of care regarding foot care management. The educators did not undertake any form of structured screening of the patients, which could have included an examination of the feet, testing for neuropathy, advising patients on how to care for their diabetes and how they could prevent foot complications. The educators' role mainly involved teaching patients how to manage their existing diabetic foot ulcers and the types of dressing to be applied. Their practice was based on what they had learned previously on the management of diabetic patient health, rather than their interventions being evidence based and up to date.

These findings are similar to those of the earlier the study by Henderson (2002) which showed that student nurses feel that lecturers have a very low profile in practice. The role of the educators in Thailand is, or at least should be, a lecturer in theory as well as a clinical teacher and patient caregiver. Educators should bridge the gap between theory and practice. However, this arrangement for education appears to be counterproductive, as educators who have very little knowledge of managing diabetic patients are teaching students in practice.

It can be argued that it is not possible for educators to fulfil both roles, of being competent in theory as well as in clinical practice. As these findings demonstrate, the educator's role should be reviewed and only health care professionals, who have the required expertise in practice, should be involved in teaching the topic to students and patients. Alternatively, if the education system requires educators to nurse patients in clinical areas and to help students integrate diabetic foot care into practice, then they should be adequately prepared for this role. Management of diabetes is a complex process requiring expertise in several areas, including therapeutic management, prevention, education and treatments for complications, such as off-loading, identification of appropriate foot wear and wound care.

The findings relating to educators, nurses and patients, confirmed insufficient foot care knowledge in educators and nurses, lack of awareness of diabetic foot complications in patients, inconsistency of foot examination, especially when involving a monofilament test, as well as a lack of awareness of inappropriate foot care behaviour in patients. It appeared that existing guidance was ineffective for health care providers and diabetic patients. These issues affected the continuing foot care of diabetic patients. There is strong evidence to suggest diabetic patients had the severity of their foot complications overlooked because nurses had not diagnosed the neuropathic status of the patient's extremities.

Naturally, Thai people felt very considerate to complain about their condition with health care providers. This lead to the lack of in depth response to the problem of care given by health care providers, and hence important issue of care or other important issues might have been lost. This is the limitation of semi structured interview that is

lack of flexibility to explore issues raised by the respondents. The significant issues might not emerge if patients did not complain about foot care service problems or any other service problems that were related to foot care during interviews. Therefore, it is possible that current semi structure interview is not sensitive enough to retrieve some in depth issues. Semi structured interviews were utilised in this study to explore the current foot care behaviour of patients and the practice of nurses and educators. However, the format of questions was adjusted by adding 2-3 sub questions per theme in order to explore insightful details. Also, the method is flexible to in order to provide participants the opportunity to explore significant issues in depth in their own time. The result focused on the foot care knowledge and patient behaviour for foot care and nursing practice, as well as how nurses provided their patients with diabetic foot education. These themes provide a rationale for phase two of the research where foot care guidelines for diabetic patients were developed. In retrospect, a format incorporating more structured questions, highlighting issues which pertain especially to the issue of diabetic foot management, would provide insights into what promotes, enables and inhibits the implementation of effective diabetic foot care prevention.

7. Conclusions

This chapter incorporated interpretations, explanations and discussion of the research findings. It explored the current practices of foot care management in Thailand by nurses, educators and diabetic patients. The data in this study showed, in particular, the current foot care practice in Phrapokkla Hospital, Chantaburi, and the perceptions of patients, nurses and educators relative to those foot care practices.

All the diabetic patients had long term diabetes and some had developed complications such as foot ulcers. Patients had some knowledge of their disease but it was not sufficient for them to change their foot care behaviours. Other psychosocial factors contributed to patients not following good foot care behaviours, such as the prohibition of wearing of shoes indoors. It would be naive to suggest that simply advising patients to wear shoes indoors will result in greater concordance. Most patients believed the health care professionals provided the best care and treatment. Most of the patients

followed the treatment prescribed by the doctor, which they believed in. Such a system, dominated by health care professionals, did not empower the patient to take responsibilities for his or her own care. A more systematic approach, using the self-efficacy model, needs to be considered for empowering patients, thus enhancing good foot care behaviour.

There was evidence that some patients sought alternative medicine for controlling glycaemia, without letting their doctor to know, as the initial treatment for diabetes resulted in unpleasant side effects. Patients should have been educated and informed on what to expect once the therapy had started.

Nurse educators in Thailand have the difficult task of combining the teaching of theories in the college and teaching in clinical practice. Educators had limited knowledge of foot care prevention, as well as limited practical skills, such as neuropathy assessment. Educators should be supported to develop their practice knowledge. Practitioners also demonstrated limited knowledge of good foot care practice. Health care practitioners should be supported to enable them to keep their knowledge and practice up to date via programmed courses.

The *ad hoc* approach to the assessment and management of diabetic patients by health care professionals can be prevented by developing tools such as the foot care guidelines and benchmark criteria for ensuring quality patient care. The development of such guidelines is discussed in the next chapter.

Chapter Six: Findings of Delphi Technique and the Design of a Foot Care Guideline

1. Introduction

This chapter describes the process and findings of the Delphi technique. The Delphi technique was used for the second phase of the research as it has been shown that this method of data collection is suitable when seeking a consensus on the development of a care guideline

Development of initial draft of Delphi questionnaire

The first draft of the Delphi questionnaire had two main sources, the literature review and the qualitative interview. The full version of this developing is showed in Appendix 6.1.3. This section showed the linkage between each recommendation and the source of literature in 10 topics.

The first topic of patient empowerment included four recommendations. The first one, that effective care and decision making should be shared between patients and health care professionals, was derived from the high–quality evidence, described as level Ia of Adolfsson et al. (2004), Sigurdardottir and Jonsdottir (2008), and Gibson (1995). Nurses should provide the empowerment role for diabetic patients (Adolfsson et al. 2004). Moreover, the recommendation of empowerment came from the summary clinical guidelines of RNAO (2004), ADA (2008), NICE (2004) and IWGDF (2007). The second recommendation regarding all patients and caregivers should be to receive foot care education. This key recommendation was based on the literature of IWGDF (2007), RNAO (2004) and understanding of the patients' and caregivers' knowledge of the disease, as well as being developed from key evidence in the literature review from sources such as Atex et al. (2008), Corbett (2003) and Fan and Sidani (2009). The third recommendation that patients should arrange their recall and have an annual review came from the summary of clinical guidelines (ADA 2008, NICE 2004, IWGDF 2007

and RNAO 2004). However, this recommendation was also mentioned by expert five. The last recommendation is that people who are older and who have had diabetes for a long time should be given vigilant care; key evidence derived from Martinez and Tripper- Reimer (2005) and Norrie et al. (2002). In additional, this recommendation was also suggested by experts 3 and 15 of the Delphi panel.

The second topic of continuing professional development was composed of the recommendation which derived from the quality evidence described as level IV byO'Brien et al.(2003), together with the quasi-experimental study of Jones and Gorman (2004). This evidence showed that training programmes for nurses improved knowledge and practice. Moreover, this recommendation mentioned that nurses who are involved in foot care need education in order to perform effective foot examinations. A key recommendation came from the summary of clinical guidelines from RNAO (2004) and NICE (2004); experts in the Delphi panel (E3, E12), as well as evidence from Foster (2004).

The third concept of foot examination and monitoring consists of four recommendations. The first recommendation was that any foot examination should contain a foot sensation test, foot pulse palpation, foot deformity inspection and footwear inspection. This recommendation was derived from both the high-quality evidence and the summary of the clinical guidelines of ADA (2008), IWGDF (2007), IDF (2007) and FDUK (2008). The concept of a neuropathy test came from the evidence described as level Ia of Meyfield and Sugarman (2000), Dros et al. (2009), Abbott et al. (2005) and the summary of clinical guidelines. Moreover, the concept of footwear assessment and foot deformity came from the literature of Manna et al.(2001), Harrison et al.(2007) and Litzelman et al.(1997). The second recommendation is the monofilament test should not be used more than ten times; the apparatus should left for at least 24 hour before using the test again. This one was developed from the meta analysis of Dros et al. (2009) and the clinical practice guideline of NICE (2004).The third recommendation is nurses should carry out a patient's risk assessment, which should include foot ulcer history, sensation test, structural and biomechanical abnormalities, circulation and self-care behaviour and knowledge. This recommendation was mainly derived from the literature review of Crawford et al.(2007), Boulton et

al.(2008) and clinical guidelines of RNAO (2004), NICE (2004), IWGDF (2004), ADA (2008); the issue was is mentioned by one panel expert (E3). The fourth recommendation is people with diabetes should be encouraged to carry out self-monitoring and self-inspection. This point was mentioned by expert (E3) and was derived from the evidence of Meijer et al.(2001),

The fourth topic involved the concept of classification of risk factors which developed from the existing clinical practice guideline of NICE (2004) and the literature review which derived from the quality evidence on level III. This classification was important for assessing foot complications and the literature showed the effectiveness of classification of foot infections, amputations, foot ulcers and hospitalisation (Peters and Lavery 2001, Lavery et al. 2005). Therefore, this recommendation was proposed using literature from IWGDF (2007) and NICE (2004). However, this recommendation was also agreed by consensus of experts 1, 3, and 16 in the Delphi panel.

The fifth topic was the concept of care for people at lower risks, which consisted of two recommendations. No evidence was found to promote effectively care for people with lower risk but there are methods of preventing foot complication such as foot ulcer, foot amputation mentioned in the literature as well as in existing clinical guidelines. Therefore, the first recommendation was the concept of foot education and foot management which derived from the moderate quality evidence in level II by Valk et al. (2005), Lavery et al.(2005) and the existing clinical practice guidelines (NICE 2004, ADA 2008, IDF 2005, IWGDF 2007, FDUK 2008). However, this recommendation was also mentioned by experts 1 and 12 from the Delphi panel. The second recommendation was supported by existing clinical guidelines (ADA 2008, NICE 2004, IWGDF 2007, FDUK 2008).

The sixth topic was the concept of care of people at increased risk of foot ulcer, which consisted of three recommendations. The first recommendation, for a referral system, came from the summary of clinical practice guidelines (RNAO 2004, NICE 2004, IWGDF 2007). The second recommendation was the concept of people being at increased risk if they are suffering from sensory loss with/or foot deformity, as it is suggested such patients will also have the tendency to develop foot ulcers and foot

complications. This recommendation, which involves foot inspection, vascular assessment and footwear evaluation, was derived from the exiting guidelines (RNAO 2005, NICE 2004, IWGDF 2007). Moreover, the last recommendation was for foot care education to be promoted for people with increased risk of foot ulcer. The concept of foot care education was supported by Calle-Pascual et al. (2002), Hunt (2009), Fritschi (2001) and the existing guidelines. In addition, those recommendations were mentioned by experts 1 and 6 of the Delphi panel.

The seventh topic was concept of care for people who are at high risk of foot ulcers; two recommendations were made. This recommendation that patients should be referred to a foot protection team was developed from the existing clinical guidelines of IWGDF (2007), NICE (2004), RNAO (2005). Moreover, the recommendation for people who had a high risk of foot ulcer was that they should receive intensive foot care education (Valk et al. 2005) and follow up (Ward et al.1999). Furthermore, the concept embraces the notion that people with a foot deformity such as claw toes, hallux limitus have a high risk of foot ulcer. This concept was derived from the literature of Ledoux et al. (2005), Boyko et al. (1999), Wu, and Amstrong (2005). The concept that the best practice in a high risk group was intensive foot care education, appropriate footwear, and paying careful attention to insole skin and nails came from the literature of Harrison et al. (2007), Dahman et al. (2008), Viswanathan et al. (2004), McIntosh (2007) and Bus (2008). These recommendations were also supported those recommendations.

This eighth concept sets out the care for people with foot ulcer and comprises eleven recommendations. In this concept, composed of sub themes of holistic and vascular assessments, foot ulcer assessment is the best intervention. The idea of wound treatment and debridement emerged from, and was supported by, high-quality evidence described as level Ia from Smith et al. (2002), Akbari et al. (2007), Hunt (2009), and Wu and Armstrong (2005). Moreover, the concept of foot assessment preventing foot amputation was supported by the evidence of Steed et al. (2006). This recommendation were derived from the existing practice guideline of NICE (2004), RNAO (2005), FDUK (2002), IDF (2005),and IWGDF (2007), with reference to vascular assessment. However, all recommendations were mentioned by experts 1, 3 and 12.

The ninth topic was the concept of foot education and provided six recommendations. Those recommendations consisted of the period of education, foot education style and content of foot education. All concepts were extracted from high to moderate quality evidence gathered from McIntosh (2007), Ward et al. (1999), Meijer et al. (2001), Calle-Pascual et al. (2002), Johnson et al. (2005), and the exiting clinical guidelines of NICE (2004), RNAO (2005), IWGDF (2007), FDUK (2008), Fritschi (2001) and IDF (2005). Those recommendations were also mentioned by experts 1, 3, 12 and 15 as well as nurses.

The last topic of nurse education provided two recommendations. Those recommendations were developed from existing guidelines from the RNAO (2005). This recommendation was also supported by experts 3 and 5, as well as from the interview findings from nurses and educators.

2. The Delphi technique process

The Delphi technique uses anonymous judgments of experts (Skulmoski et al. 2007) to arrive at a consensus for the practical management of a problem and enables the considered opinion from experts to be elicited without face to face or group interaction. This process consists of three characteristics: anonymous group interaction and response, group response and feedback, and statistical analysis (Collins et al. 2001).

2.1 Panel of experts

The panel experts were recruited purposely to establish the Delphi technique. Twenty participants were invited to form the panel of experts from different primary, secondary and tertiary hospitals around Thailand, where diabetic patients were managed or referred. Twenty participants agreed to be part of the panel and their areas of expertise are shown in Table 6.1.

Table 6.1 Expert panel members' characteristics

Characteristic	**N**	Percentage
Gender		
Male	6	30
Female	14	70
Current position related to diabetic foot clinic		
Clinical nurse in a diabetic clinic	1	45
Nurse educator in university	1	10
Nurse manager in a diabetes clinic	1	5
Rehabilitation doctor in a foot clinic	3	5
Surgical doctor: General and Urology	1	5
Medical doctor: Endocrine	3	15
Director of medical doctor	1	5
Physiologist in a foot clinic	3	15

There were six male and 14 female members in the panel. There were 12 nurses; this included two nurse educators, who worked in a university, taught diabetic topics and their special clinical and research areas consisted of wards with patients suffering from diabetes. One nurse worked as a nurse manager and nine nurses had worked in the diabetic clinic for at least three years, one rehabilitation doctor, one surgical doctor, four medical doctors and three physiologists who worked in a foot clinic in a private hospital and The Leprosy Institute of Thailand.

2.2 Criteria for selecting the panel of experts

Good diabetic foot management requires the collaboration between several health care professionals and this principle was adopted when selecting the panel of experts. Practitioners, who were selected from primary, secondary and tertiary care settings, consisted of nurses, doctors and physiologists from every level of the health system in Thailand.

The panel was selected solely from experts in Thailand for several reasons as mentioned in chapter 4. All the experts were familiar with the Thai health care system, the patients and their behaviours, the influence of the organisation and they had a good understanding of the issues present in the management of diabetic patients. The experts were in senior positions within the health care systems and would therefore be able to provide information, which would be invaluable in developing a foot care guidelines that can be accepted by all health care professionals, and be applicable in Thailand. The panel could be influential with the implementation of the guideline and would give it more credibility as a result of being developed by local experts. All practitioners had a minimum of three years or more of clinical experience and specialist diabetic knowledge, and were involved in the day to day management of diabetic patients including diabetes and foot care management, education and advice on the prevention of complications. All of the experts were currently working with diabetic patients and included the following groups of practitioners, such as consultants, Advance Practitioner Nurses (APN), and managers with a good track record of research and publication (Appendix 3).

2.3 The consensus of agreement

The consensus of agreement was important in the development of the foot care guideline. Although there are controversies on what constitutes levels of agreement and consensus, Linstone and Turoff (2002) suggested that the final round should show greater convergence of opinions. The selection of a percentage threshold for inclusion of items appears to be a common interpretation of agreement and this approach was used in this study. However, the setting of the percentage level varies and Keeney et al. (2006) recommends a 75% consensus for demonstrating robustness of the agreement. The consensus agreement therefore across the panel in this study was set at 80% to show a greater confidence interval.

3. Questionnaire design and scoring method

The questionnaire used in phase one of the Delphi was formulated following a critical review of the literature regarding best foot care practices nationally and internationally (NICE 2004, RNAO 2004, IWGDF 2007), and the findings and analysis of the interview data.

The questionnaire consisted of 37 statements grouped in 10 subsections (as shown in Appendix 6.1.1). For each statement, the panel members were asked to indicate their expert opinion using the Likert scale, with three levels (strong agreement, agreement with recommended changes and no agreement). The questionnaire consisted of a synthesis of the literature review and the phase one findings. It included, as the basis for a set of clinical guidelines, the procedure of foot assessment (appendix A), using a monofilament test (appendix B), risk assessment (appendix C), assessment of structural and biomechanical abnormalities (appendix D-1), assessment of appropriate footwear for diabetic patients (appendix D-2), location and palpation of pedal pulses (appendix E), the classification of four stages of risk association of diabetic foot (appendix F), grading a diabetic foot ulcer (appendix G), foot care education (appendix H), and choosing footwear for neuropathy problem (appendix I). Participants were also asked to make comments for each statement. Participants' opinions were also sought regarding the practical aspects of conducting the assessments.

Administration of Questionnaire - Delphi Round 1

The questionnaires were posted to all 20 members of the panel with an introductory letter including the researcher's contact details and a stamped self-addressed envelope for returning the completed questionnaires.

4 Findings of the Delphi technique

4.1 Round 1 Findings

Nineteen questionnaires were returned, representing a 95% response rate. One participant, who was a doctor, did not return the questionnaire. One questionnaire was

partially completed and direct feedback was given orally at a face-to-face meeting with the researcher. The responses were from a cross-section from the panel of experts from different professional groups, different hospitals and those who worked in different places.

The comments and agreement findings from Round 1 questionnaires were categorised and grouped under 10 topics. The topic were as follows: 1) patients empowerment and education; 2) continuing professional development, 3) foot examination and monitoring; 4) classify of risks; 5) care of people at lower risk; 6) care of people at increased risk; 7) care of people at high risk of foot ulcers; 8) care of people with foot ulcer; 9) patient empowerment and education and 10) education of nurses.

4.2 Consensus of the Delphi technique in Round 1 and 2

The findings from Round 1 of the questionnaires were analysed. Thirty-seven recommendations obtained agreement and consensus was reached at 85%. These are described in more details under the following sub headings. The statements are grouped under the 10 subheadings for the purpose of this discussion.

Topic 1 Patient Empowerment and Education

This topic consisted of four statements and modifications were suggested in relation to them:

Statement 1.1: Suggestions included that ‘effective care and decision-making should be shared between patients and health care professionals’. The consensus with the statement was 90%. However, 41 % (n=7) of participants recommended that caregivers should be empowered. For example, participant 13 suggested that:

‘*Empowerment should encourage caregivers because most of patients were old and they were unable to self-foot care.’*

This was subsequently adjusted in the questionnaire for Round 2.

Statement 1.2: There was 90 % consensus that all patients or caregivers should get a specialised education: understanding of their condition and the resources available to optimise their general health, diabetes management and ulcers control. Five participants stated that patient education should be provided individually or through groups. Each patient should understand his or her complication or condition and have access to information on foot care and treatment and the resources available to promote self-care.

In relation to the statement 1.3 of '*continuing care requiring annual patient recall',* there was 80 % consensus. Participants highlighted that patients should perform foot examination jointly with the health care provider at least once a year, or should do so continuously, and have a 'follow up' based on the risk level of the patient to monitor the development of foot complications. Participants suggested that in such cases, the frequency of recall should be every three to six months.

Statement 1.4: *People who are older and have had diabetes for a long time, poor eyesight, poor footwear, smoking, live alone should be examined carefully*. The consensus with this statement was 85%. Six participants highlighted that explanation on how to examine feet carefully should be included and that patients should participate in self-foot care.

Topic 2 Continuing Professional Development

The topic consisted of a statement involving nurses and professionals in the assessment of diabetic feet and that they should have adequate training. This statement consensus was 90%, with suggestions for modification. Participants highlighted that nurses and health care professionals managing diabetic patients should receive specific training in foot management, while some participants suggested that professionals should be trained in diabetes care.

Although most participants agreed with this continuing education, participants acknowledged that nurses were often unable to implement what they have learned in theory into practice. Specially, one participant suggested that quality of foot care service should be set a published standard of foot care, or guideline.

Topic 3 Foot Examination and Monitoring

This topic consists of four statements for consensus. The details of each statement are as follows:

The first statement was on foot examination and there was 90% agreement that health care professionals should test for foot sensation using 10 G Semmes-Weinstein Monofilament or vibration and should palpate for foot pulse, inspect for foot deformity and recommend suitable footwear. Seven participants highlighted that monofilament testing can overlook the more serious problem of severe peripheral arterial disease (PAD) and that a thorough neuropathy (involving details of sensory, motor and Automatic Nervous System) as well as a PAD assessment should be performed. Participants suggested that this statement should be revised and combined with statement 3.1, and 3.3, and should identify an assessment tool.

Moreover, one participant suggested in the form of risk assessment that:

'This statement should assess risk factors of foot ulcer history, amputation, smoking, poor eyesight, retinopathy, duration of diagnosis diabetic.' [Expert 6]

Moreover, one participant mentioned that vibration is a specialised form of testing and was not suitable for included in the guideline. Furthermore, there were insufficient vibration testing tools and staff did not have the relevant knowledge and skills to use them. The monofilament test was recommended as providing the best choice for sensation testing in primary hospitals or secondary settings.

Two participants said that they had no experience of vibration testing:

'*I had never been trained for vibration testing with a tuning folk in secondary hospital. I need to know whether nurses are able to do vibration test with tuning folk.'[Expert 13]*

Statement 3.2 asked participants if monofilaments should not be used to test more than ten patients in one session or should be left for at least 24 hours to recover between sessions. This statement achieved a consensus of 80 %. Participants with experience of using monofilaments found 'bucking' after only 3-4 uses on patients. Armstrong (2000)

suggests that differences in the manufacture and cycles of applied stress can make these devices inaccurate and potentially hypersensitive in identifying loss of protective function. Participants who disagreed with this statement said that

'*In my experience, a used monofilament was found bucking; that mean bending and not returning to its original position. Although the monofilament was left, it did not recover.' [Expert 1]*

This, participant's disagreement was supported by participant 13.

'*I am not sure in this statement; in practice bucking monofilament had recovered, it lost the bend.'*

Furthermore, one participant was unsure of this statement and said that:

'*I thought that the number of 10 people per test was too much because I found that monofilament was bucking after using it only 3-4 patients.' [Expert 11]*

Statement 3.3 asked whether nurses should accomplish a foot risk assessment for all diabetic patients. The risk assessment includes history of previous foot ulcers, sensation by testing with 10 G monofilament or vibration, structural and biomechanical abnormalities, circulation by testing foot pulse palpation, and self-care behaviour and knowledge. The consensus for this statement was 90 %. Regarding foot ulcer history, participants suggested the addition of any history of amputation, claudication, smoking, duration of diabetes, control glycaemia, eyesight, age, renal failure, and malnutrition. As part of biomechanical assessment, participants suggested the addition of limited joint mobility and foot pressure abnormality in this assessment. For foot ulcer history, a participant reinforced the importance of recording wound healing:

'*The duration of wound healing should be recorded in the result of assessment. In my experience, some patients had foot ulcers that needed 2-3 days to heal.' [Expert 11]*

Statement 3.4 asked participants whether diabetic patients should be encouraged to undertake self-monitoring of glucose and perform daily foot inspections. The consensus with this statement was 85%. Seven participants recommended clarification on self-

monitoring and factors such as time and duration of self-foot examination. They also recommended improving the language of the text. One participant suggested excising this statement.

Topic 4 Classification of Risk Factors

There was one statement asking whether patients should be grouped according to their level of risk of developing foot complications. The risk levels were; 'lower current risk', 'at increased risk', 'at high risk' and 'foot ulcer'. The consensus was 90%. Ten participants commented that the level of risk should be revised at each assessment when the patients attend the clinic. Moreover, participants suggested checking for consistency between Appendix C- guideline for foot assessment and a risk screening and Appendix F – the classification of the diabetic foot on level of risk, as set out in the Delphi questionnaire. Moreover, a participant suggested risk classification so that

'Each level of risk should be clarified; the meaning of loss due to neuropathy and more details of any risk factor such as pulseless, history of foot ulcer should be added.' [Expert 9]

This was supported by expert 11:

'*The very high risk group should include any history of foot ulcer.' [Expert 11]*

Topic 5 Care of People at Lower Current Risk

This topic achieved consensus at 90%. This topic consisted of two statements.

The first statement asked whether nurses should discuss and agree with patients on a management plan, which consisted of an appropriate foot care education programme so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm. Participants highlighted that the control of glycaemia to normal should be included as part of the education programme. One participant did not agree with risk classification. This participant stated that:

‘*Normally, all patients should have their sensory neuropathy assessed and I consider that all patients who have a problem of sensation loss at least at one point, foot deformity, ABPI test > 0.5 should refer to foot care team. I did not agree with risk classification.’ [Expert 5]*

The second statement asked if patients who are at lower current risk should be reviewed annually. The consensus with this statement was 90 %. Two participant highlighted *‘skills of self-foot care should educate diabetic patients at low risk group in order to promote the confident of foot care.’ [Expert 8, 14]*

Topic 6 Care of people at increased risk

This topic consists of three statements. The first statement asked if patients who are at increased risk should be referred to a foot protection team. The consensus with this statement was 90%. Participants highlighted that additional information should be given to define increased risk and should address the referral system, such as referral to surgery or doing ABPI testing.

The second statement asked whether patients who are at increased risk should have 3-4 monthly examination of their feet, reviewed by a foot protective team. The consensus with this statement was 85% and participants suggested expanding on foot care education.

The third statement asked whether patients at increased risk of developing foot ulcers and those with neuropathy should have enhanced foot care education and be encouraged to undertake self-foot care (Appendix H- Foot care). The consensus was 75%. Participants suggested defining the meaning of neuropathy and adding time for self-foot care and improved the language of text.

Topic 7 Care of People at High Risk of Foot Ulcer

The topic consisted of two statements and the consensus was 90%. The statement involved referral to the foot protection team and foot examinations. The detail of foot examination included foot inspections, review for vascular assessment and evaluation

and the provision of appropriate intensive foot care education to include specialist footwear, insoles, skin, and nail care. Participants highlighted that further supportive guidance should be included, such as ABPI testing and defining the characteristics of the high risk group. Moreover, participants commented on the criteria of vascular assessment in the text:

'*Criteria for vascular assessment were unclear. It should review the need for vascular assessment, such as palpation t*est *or ABPI test.' [Expert 9*]

Following the comment of the expert, the criterion of vascular assessment was reviewed and it was decided to use both palpation test and ABPI test as shown in Appendix 6.1.1.

Topic 8 Care of People with Foot Ulcers

The topic involved wound management and foot assessment in order to prevent foot ulcer recurrence. This topic consisted of 11 statements.

The first statement asked whether a patient with a new foot ulcer should be urgently assessed by an appropriately trained health professional. The consensus was 85%. Participants highlighted that more details should be given on the step of assessment in terms of urgency. [Expert 9,14]

The second and fifth statements asked if patients with diabetic foot ulcers should be assessed for signs and symptoms of infection. The consensus reached 90% as diabetic foot ulcers tend to become infected. The participants suggested diabetic patients with foot ulcer should be referred to the MDT to receive prompt treatment. Moreover, one participant [Expert 14] suggested reviewing the content of the fifth statement which overlapped in the seventh statement.

The third statement asked about the assessment process and there was 90% consensus that the following should be included: a health history, allergies, medications, functional assessment, and physical examination-neuropathy, vascular status, callus, infection, and foot deformity or a pressure ulcer together with diabetes management. One participant suggested the principle of wound assessment should follow the acronym MEASURE,

which consisted of measure, exudate, appearance, suffering, undermining, reevaluation, and edge. [Expert 14]

Five participants highlighted the emphasis on patient's exercise. The experienced participants reported that patients with foot ulcers, or in the high risk group, should be advised on doing special exercise and encouraged to exercise and this advice should be include in the guideline. For example:

'*I found that a patient with foot ulcer exercised by jogging and as a result the foot ulcer healing was delayed. Patient with foot ulcer should be taught the importance of exercise. Patients in the high risk group should exercise by swimming, cycling, while anyone with a foot ulcer should do only cycling and avoid jogging.' [Expert 7]*

A fourth statement asked if patients with foot ulcers should have a vascular assessment of the lower extremities for vascular supply. This consensus was 90% and participants highlighted the addition of ABPI testing should be added to this statement, plus specific testing with dorsalis pedis, posteria tibial and branching test. [Expert 5, 9] Moreover, participant suggested that symptoms of ischemia such as calf pain, pale foot while lifting leg, hair skinless, light skin, and thick nail should be part of the assessment. [Expert 5]

The sixth statement in this category asked about the importance of assessing for autonomic, sensory and motor (S.A.M) changes, in order to identify peripheral problems. The consensus was 90% and participants highlighted that this item should be revised and regrouped with foot examination and should clarify how to assess S.A.M and clarify which items to assess.

The seventh statement asked about the assessment of deformities, foot pressure, gait, footwear and device, and facilitated appropriate referral. This statement reached 90% consensus. Participants highlighted that the researcher should consider 'off–loading' and give appropriate referral of diabetic patient with foot ulcer. [Expert 5]

In the eighth and ninth statements, there was 90 % consensus that the DFU should be assessed in detail to include location, length, width, depth, ulcer bed, exudates, odour

and peri-ulcer skin, and to classify the ulcer using the Wagner or University of Texas system. One participant suggested rewriting in the eighth and ninth statement [Expert 20]. This participant suggested that the ninth statement regarding assessment of factors that promote wound healing should be combined with the eighth statement assessing the characteristics of wound. In the next questionnaire round, this suggestion was revised in Thai language as the ninth statement (Appendix 6.2).

The penultimate statement in this category included details of wound management. There was 85% agreement that debridement, infection control, a moist wound environment and pressure redistribution should be taken into account. Participants pointed out that there should not be debridement of ischemic wounds and that the patient should be referred for vascular surgery.

A final statement asked if individuals identified as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment, specialised diabetes, foot care treatment and education teams as appropriate. There was 85% agreement with some participants indicating that nurses should provide basic foot care and arrange primary treatment prior to referral foot care team. The aim of referral was to receive prompt foot assessment and foot management in order to prevent foot ulceration [Expert 5].

Topic 9 Patient empowerment and education

Statements relating to patient empowerment and education consisted of seven recommendations. The statement consensus was 85- 90%. However, six of the participants suggested that this topic was similar to topic 1, and that these two topics ought to be combined. Thus in Round 2, topic 9 was removed in its entirety and relevant sections incorporated in topic 1.In this topic, there is commentary on what foot care education should provide:

‘*All patients should receive the foot care education in same way and content should follow the protocol or guideline. Moreover, foot care education should provide knowledge of foot complication signs and symptoms of both neuropathy and vascular*

system. Daily self-foot care should be included to prevent foot complications'. [Expert 13]

This is supported by expert 5 and 9.

'*Patients should receive knowledge of foot problem, signs and symptoms of foot complications, foot care to prevent foot problems and the resources available for foot care.' [Expert 5, 9]*

In addition, the styles of education were suggested by expert 9.

'*Patient education should include pictures, which are easy to understand.' [Expert 9]*

It was supported by expert 3.

'*Individual foot care education should be the best way to provide foot care. Health care providers should be trained in counselling skills for foot care educators.' [Expert 3]*

Furthermore, the use of supportive group was suggested by expert 7.

'Self–help group for diabetic patients should be used to educate diabetic patients.' [Expert 7]

Topic 10 Education of Nurses

Two statements asked about the importance of the education of nurses in providing foot care education and management. There was a strong consensus of 90%. Participants strongly agreed that nurses should have the knowledge and skills in the following areas so as to competently assess patients at risk of developing foot ulcers and provide the required education and referral, skills in conducting an assessment of the five risk factors, knowledge and skills in education of patients, and knowledge of local referral sources.

There were high levels of agreement that health and nursing educational institutions should integrate nursing practice guidelines for reducing foot complications for people with diabetes into the basic nursing education curriculum and provide continuing

educational programmes in this topic area for qualified staff. For example, participants suggested:

'*Nurse training curriculum should add knowledge of mechanism of diabetic foot complication, pathology and physiology of neuropathy and foot problem. Nurses should know the reasons for foot care and promote self-awareness of diabetic foot care in diabetic patients.' [Expert 5]*

A participant commented on overall foot assessment.

'*Foot examination in a diabetic patient took at least 10 minutes' time per person. Each client needed an explanation of the result of the examination and planned foot care. If it is a tool which needs less time, it will promote the diabetic patient's attitude towards foot examination and will increase the patient's satisfaction.'[Expert 13]*

Finally, the panel suggested that there were a great deal of similarities between topic 2 and topic 10. They suggested the removal of topic 10, combining relevant sections into topic 2 which was implemented in Round 2.

Developing Appendices A-I from Delphi questionnaire Round 1.

The following appendices (A-I) were incorporated in the questionnaires to ensure that participants knew exactly what processes, procedures and interventions were being discussed and to increase the validity of the responses. (These appendices were in the Thai language and have been reproduced here in the English version). Participants also suggested changing the A-I appendices to a numerical system (1-9) as there is no equivalent alphabet system in the Thai language, causing more confusion. Therefore, in Round 2 the appendices have been listed using the numerical system.

Participants were asked whether a risk algorithm, as shown in Appendix A of the questionnaire, would be useful in categorising the level of risks for diabetic patients. There was 100% agreement that the guidelines should include an algorithm for identifying risks and planning interventions accordingly.

Appendix B detailed the procedure for using the Semmes-Weinstein 10 G Monofilament assessment for neuropathy. The consensus was 85% with recommendation for including step by step guidelines for undertaking the procedure. The procedure was commented on, identifying the amount of tests to be used. The onset of pressing the monofilament was suggested by expert 12.

'*The time of holding the pressed monofilament to skin should be reviewed 1-1.5 seconds (recommendation of Health Thailand suggested by Expert 6) or 2 seconds or 1-3 seconds.' [Expert 12]*

The step of testing monofilament was supported by expert 1 and 12.

'*The sequencing of monofilament test should be reviewed in issues of testing, position of testing site on the foot, and repeating the sequence randomly at each testing site.' [Expert 1,12]*

These views are supported.

'*The position of testing sites on the sole of foot should be reviewed. There is evidence showing the four sites and the five sites of testing the sole of foot.' [Expert 12]*

'*I use three points site of testing the sole of foot at the first toe, the first metatarsal, and the fifth metatarsal which following ADA 2008.' [Expert 1]*

Appendix C asked participants opinion about foot assessment and a risk screening guide. The consensus in each item was 80%. This examined ten risk factors in foot ulcer and required yes or no question (Appendix 6.1.1). It was modified from the Diabetes Foot Assessment or Risk Screening guide of The Canadian Guideline for Foot Care (RNAO 2004, p. 57). The items of risk screening consisted of 1) current foot ulcers, 2) site of sensory loss, 3) callus and foot deformity, 4) dorsalis pulseless and painful history, 5) self foot examination, 6) inappropriate foot wear, 7) foot care education, 8) the time of self foot examination and problem, 9) seeking to see healthcare providers, and 10) releasing injury of foot. Participants suggested changes to the assessment of the callus site, the autonomous systemic (ANS) dysfunction such as hairlessness, cracked skin, dry skin or thick nails because these symptoms increased the likelihood of foot

complication, also to clarify claudication and non-palpation. Some suggestions were made by expert 9 to adjust the statement.

'The item for assessing risk factor should be improved. Statement 7-10 used negative phrasing. The item should be grouped with the different kinds of foot problem and foot deformity.' [Expert 9]

In addition, improvement was suggested for each risk item. For example, one expert supported:

'The autonomous systemic dysfunction, which causes dry skin, hairless and heel cracking because of dysfunction of sebum gland, should be added. This cause is a risk factor of foot ulcer in my experience.' [Expert 3]

It was supported by expert 12.

'The item of pulseless and claudication should be separately considered and the language should improve.'

Three experts asked for more on footwear to be included:

'The item of poor fitting footwear should add the detail of sandals which is inappropriate footwear and the language in this statement should be adjusted.' [Expert 1,3,11]

Finally, self-assessment and the frequency of assessment were raised as improvements:

'The item of self-foot care should add that the caregiver or relative should, or could, be encouraged to do foot care for patients'. [Expert 9]

And:

'All items should be adjusted regarding the order of assessment.' [Expert 20]

Appendix D consisted of two forms: the first form involved examination for structural, biomechanical abnormalities and secondary form related to the assessment of appropriate footwear. Areas to be assessed included toe deformity, prominent metatarsal

heads with inadequate soft tissue padding, hallux valgus or bunion, bony prominence, the kinds of amputation (partial foot amputation, below knee amputation, above knee amputation), Charcot's joint, blister, callus or corn, fungal infection and other (Table 6.2). The consensus was 85%.

Table 6.2 Items for examination for structural and biomechanical abnormalities

	Right	**Left**
Bony and soft tissue deformities including:		
Toe deformities (claw or hammer toes)		
Prominent metatarsal heads with inadequate soft tissue padding		
Hallux valgus (bunions)		
Bony prominence		
Partial foot amputation		
BKA,AKA		
Charcot's joint (foot warm, swollen, red and painless during active phase)		
Blister		
Callus/Corn		
Fungal infection.		
Other		

There was agreement that the best position for inspection of feet is in the standing position, as it shows the weight bearing of the foot and foot pressure. Moreover, the recorded form should be illustrated with a picture and record form for both feet.

A number of participants suggested that a draw or photograph picture is a good way to develop form for foot assessment:

'*The characteristics of deformities and biomechanical factors should be regrouped in the set of foot deformities, and amputation including skin problems such as blister, callus, fungal infection, dry skin. Moreover, the picture should be provided in this appendix.' [Expert 9, 14, 19]*

'*A picture of each deformity, structural or biomechanical foot which is easy to understand should be included.' [Expert 6]*

Furthermore, a copy of the assessment form can be found in appendix D. This assessment form comprised of 11 items of the characteristics of appropriate footwear (show item in Table 6.3). Participants suggested the detail of shoe heel, insole and outsole footwear, material of footwear, and shape.

Table 6.3 items for assessing appropriate footwear in Appendix D-2

Item		
	Yes	No
1.The heels of the shoe are less than 1 inch (2.5 cm)		
2.The shoes have adjustable laces or buckles, to hold shoes onto foot		
3 The length of the space between the tip of longest toe and the end of the shoe is at least 1-2 inches when standing		
4.The shoes have well-padded soles		
5.The shoes must cover the front of part of the feet and wrap around the heel to prevent possible injuries		
6. Shoe materials are made of clothes and/or leathers which promote better air circulation and inhibit fungal growth.		
7. The shoe shape has a similar shape to the feet.		
8. The heel counter of the shoes is fit and firm.		
9. The width and the length of each shoe should be unequal because the size of each foot is naturally different.		
10.Location of the first metatarsals phalangeal should be located at the widest part of the shoe		
11. The area inside the shoes at the fore foot part and across the site of metatarsophalangeal joints should be wide and deep enough to promote the comfortable movement of the shoes.		

This is a comment from participant on the position of testing:

'*The position of testing fitting appropriate footwear should be standing with balance and weight on both feet.' [Expert 3]*

Regarding the characteristic of appropriate shoe, the following was supported by expert 1,3,6,9 and16.

'The shoe should cover the front part of the feet and cover around the heel to prevent possible injuries. Thai people wear covered shoes but they should accept only ones that wrap around the heel.' [Expert 16]

'The length of the space between the tip of longest toe and the end of the shoe should be 3/8 -1 inches (in first round is 1-2 inches) when standing.'[Expert 1,3,6]

'In experience, the length 1-2 inches is too long and causes patients to fall over or experience other injuries.' [Expert 3,9]

'The heel of shoes should be 1-1.5 inch and the front is 1 inch and back is 1.5 inch in order to prevent falling down and protect the Achilles tendon from stretching too much while walking.' [Expert 1,3]

However, there was some opinion on what prevented people wearing suitable footwear, provided by experts 5 and 19.

'Although appropriate footwear is essential for diabetic patient, patients were not concerned about wearing appropriate shoes. Therefore, foot care education should concern reasons for patients not wearing the right shoes. Not wearing appropriate shoes stems from the patient's lifestyle or the occupation of the patients. Some patients had appropriate shoes and wore them sometimes and later on stopped wearing them.'

A participant suggested that the form should provide information about how to use this form and how to evaluate the result of examination. [Expert 12]

From all comments of the experts, it was concluded that a drawing or photograph picture is a good way to develop the assessment form in clinical practice guidelines. Desirable aspect of shoes should also appear in appendix D. Moreover, it was determined that the introduction of a standard procedure and criteria for evaluation should be provided at the beginning of foot assessment.

Appendix E showed the location and palpation of pedal pulses. There was 85% consensus on the two sites for recording the pulse. Participants recommended including pictures of the dorsalis pedis and posterior tibial sites so that staff could easily indicate the site used for detecting a pulse. They recommended the use of the criteria 'good', 'fair' and 'poor' for evaluating the quality of the blood flow, to use as a guide for correct referral system and decision [Expert 3]. Moreover, one participant suggested caution with palpation in the case of misposition of carotid pulses. It may cause emboli if there is a plaque in the blood vessel. [Expert 19] This was supported by expert 12.

'*I agreed with this assessment and suggested rearranging the step of palpation and the guidance should add detailed criteria of evaluation.' [Expert 12]*

Appendix F showed the four risk stage classification of the diabetic foot (adapted from IWGDF 2007, NICE 2004, Peters and Lavery 2001). These were divided according to *'low risk', 'at increased risk', 'at high risk' and 'very high risk/previous foot ulcer'* of developing foot ulcer or foot amputation.

Comments from the participant which influenced the development of this section included:

'*Each risk level group for all patients should be educated self-foot care and added detailed self-foot examination.' [Expert 11,19]*

'*The result of foot examination should be explained to patients. It should inform patients of the result of foot examination such as the abnormality of their foot is the key factor in foot care service.' [Expert 5]*

Regarding to foot care instruction, expert 12 reported:

'*Nurse should review self-foot care knowledge at each risk level to all patients. For example, do not walk bare foot, and how to perform a thorough self-assessment. Information about wound care should be added for patients group with a foot ulcer.'*

There was 85% consensus that such a risk categorisation system should be used to identify patients at risk, in order to receive appropriate interventions. From the participants' comments, this four stage classification clarified the meaning and criteria of each risk classification. Therefore, this appendix was used as the standard criteria of foot risk classification in this guideline.

Appendix G participants were asked to choose between the Maggitt-Wagner Ulcer Classification and the University of Texas Staging system as these two are currently in use in the hospital. Eighty-five percent chose the University of Texas Staging system because of their experience and its usefulness. All participants agreed that they had

experience with the University of Texas staging system in training. They agreed that this system classified clearly between grade and stage of infection.

'*This item should be shown in the tables giving example of each grade.' [Expert 12]*

'*This system should be taught in nursing student bachelor degrees as the principle means of foot ulcer documentation, because this system has been shown to promote communication among MDTs and guide the treatment of foot ulcer.' [Expert 3]*

Appendix H involved foot care tips/guidance for patients and nurses. The consensus was 85%. Participants highlighted that more information on foot care, foot exercise and guidance for managing foot ulcers should be given to patients. Participants suggested adjusting the language. Here is the suggestion of one participant regarding this appendix:

'*This appendix should include the picture as in photograph of daily foot care and the information of risk factors for diabetic foot ulcer, the objectives of daily foot care and the procedures of daily foot care. That information should be provided the diabetic patient. This education should be based on the information of Diabetic Disease Association of Thailand or the toolkit of Dr Han Himatongkhum.' [Expert 12]*

Appendix I provided guidelines on the choice of footwear for diabetic patients with neuropathy. Participants pointed that some types of shoe were not suitable and acceptable for Thailand because of the hot climate, clothing worn and financial status. The experience of the panel was that in certain occupations in the local setting, the wearing of Sarongs had an impact on what the patients could wear, and that the wearing of sports shoes and boot-style shoes was impractical. Other psychosocial factors already discussed in Chapter 5 discouraged patients from wearing appropriate shoes indoors and outdoors. In addition, participants suggested that the characteristics of appropriate footwear should be soft, adjusted and wrap the heels for Thai culture.

4.3 The ongoing feedback process and adjusted questionnaires

After analysing the completed questionnaire and getting feedback from Round 1, the questionnaire was modified and the 36 statements were grouped into eight topics, as shown in Table 6.4.

Table 6.4 Adjusted topics in questionnaire Round 1 to Round 2

Questionnaire Round 1	Questionnaire Round 2
Topic 1 Patients empowerment and education	Topic 1 Patients and caregivers empowerment and education
Topic 2 Continuing professional development	Topic 2 Continuing professional development
Topic 3 Foot examination and monitoring	Topic 3 Foot examination and monitoring
Topic 4 Classification of risk	Topic 4 Classification of risk
Topic 5 Care of people at lower risk	Topic 5 Care of people at lower risk
Topic 6 Care of people at increased risk	Topic 6 Care of people at increased risk
Topic 7 Care of people at high risk of foot ulcers	Topic 7 Care of people at high risk of foot ulcers
Topic 8 Care of people with foot ulcers	Topic 8 Care of people with foot ulcers
Topic 9 Patient empowerment and education (combined with Topic 1)	
Topic 10 Education of nurses(combined with Topic 2)	

In accordance with the expert panel suggestions, topics for questionnaire II was revised. Four statements in topic 9 were regrouped in topic 2 as the topics were very similar or closely related. Two statements in topic 10 were regrouped in topic 2 continuing professional development.

Responses and comments from the first round were gathered and sent to each panel member in Round 2, along with a covering letter explaining the details of the rewording the questionnaire in underlined words, the agreement report and the panel's comments from Round 1.

4.4 Round two findings

Sixteen completed questionnaires were returned (80%) from the panel of experts from different hospitals around Thailand and were considered sufficient for the study due to the level of expertise of the participants. The overall agreement reached was 85% and as the modifications had been implemented as suggested, there were very few additional comments

Topic 1 Patients and caregiver empowerment and education was adjusted and reworded from the first questionnaire. It consisted of nine statements that received consensus between 94 - 100%. Only statement 1.4 that nurses in all practice settings should give and reinforce basic foot care education got the consensus of 94%. All others were rated at 100%. The participant suggested that patients should receive individual foot care education suitable for their risk status. Moreover, in statement 1.7 participants suggested that risk factors such as smoking, cholesterol level, high blood pressure, appropriate footwear and foot exercise should be included in patient education. The style of education should be in the form of counselling.

Topic 2 Continuing professional developments consisted of three statements and the consensus was between 94-100%. Nurse and health care professionals should obtain training and the knowledge of nurses should be up-to-date.

Topic 3 Foot examination and monitoring was composed of four statements. The consensus increased from 87 to 100 %. Only the statement that monofilament should not be used in more than 10 patients in one session reached 87 % consensus, all others were rated at 100%.

Topic 4 Classification of risk factors for foot ulcers. The consensus on this topic was 100%. The participant suggested that risks of renal failure should be included in the guidelines. Additionally, the criteria of each level of classification should be reviewed.

Topic 5 Care of people at lower risk consisted of two statements and the consensus reached 100 %. The participants suggested the rewording of some of the text.

Topic 6 Care of people at increased risk consisted of three statements and reached the consensus between 94-100%. The statement of foot examination in patients who are at increased risk should be reviewed and should include the need for vascular assessment. Participants suggested that all neuropathy patients should always have their vascular status assessed. Furthermore, participants suggested that a checklist form should be evaluated for standard of assessment in foot inspection, vascular assessment and footwear evaluation. Participants recommended that sensory assessment, motor assessment and autonomic nerve ANS should be included in the assessment

Topic 7 Care of people at high risk of foot ulcers consisted of two statements and reached a consensus of 94-100%. Patients at high risk of foot ulcer should be seen by health care professionals at least every1-3 months. Participant suggested the addition of evaluation of any risks, which would inhibit wound healing and prevention of foot ulcer recurrence. A checklist form should be used for standardised assessment because of the performance of the assessor. Participants recommend that sensory assessment, motor assessment, and autonomic nerve system (ANS) should be included in the assessment. Additionally, foot exercise, off-loading and trimming of calluses should be added to care of people at high risk of foot ulcer.

Topic 8 Care of people with foot ulcers consisted of eleven statements and reached the consensus of 94 – 100%.

Appendices from questionnaire Round 2

The appendix in Round 2 was changed from A-I to 1-9 as explained earlier, in order to be easily understood in the Thai language. All appendices were revised and reached 100% consensus with some suggestion as described below.

Appendix 1 had been revised to include interventions for each category of risk as recommended in Round 1. There was 100 % agreement for appendix 1. Details of the changes can be found in the Round 2 questionnaire.

In appendix 2 step-by-step guides for performing the neuropathy assessment using the 10 G monofilament were given. This statement received 100% consensus with further recommendations including a drawing or photograph pictures of the sites for the monofilament test.

Appendix 3 consisted of diabetic foot assessment risk screening guideline. The agreement for this appendix had increased from 80% to 100%. The translation into the Thai language was still not very clear and participants recommended minor alterations.

Appendix 4 described the structure and biomechanical abnormalities. The consensus increased from 85% to 100%. However, participants also suggested that the assessment of Charcot's foot characteristics was not clearly stated. In case of partial foot amputation, the form should address differences relating to toe amputations or mid-foot amputation. Moreover, participants suggested adding management form, care plan, or referral. The form for assessing appropriate footwear evaluation reached the consensus of 94%. Participants suggested changing the language and adjusting the item of appropriate footwear.

Appendix 5 described the location and palpation of pedal pulses. This appendix reached 94% consensus. The participants suggested reviewing the criteria of evaluation and adjusted the palpable a drawing or photograph picture.

Appendix 6 discussed the classification of the four stages of risk of diabetic foot ulcer (adapted from Peters and Lavery 2001, IWGDF 2007). This table showed in Thai language the criteria of each risk group. The consensus for this appendix was 100%. The participants suggested adding motor testing in each group and evaluation of testing.

Appendix 7 included the grading diabetic foot using the University of Texas system and achieved 100 %consensus. In addition, participant recommended that the tool should be translated into Thai language so that all health care professionals would be able to use them.

Appendix 8, tips for foot care, achieved 100% consensus with no comment.

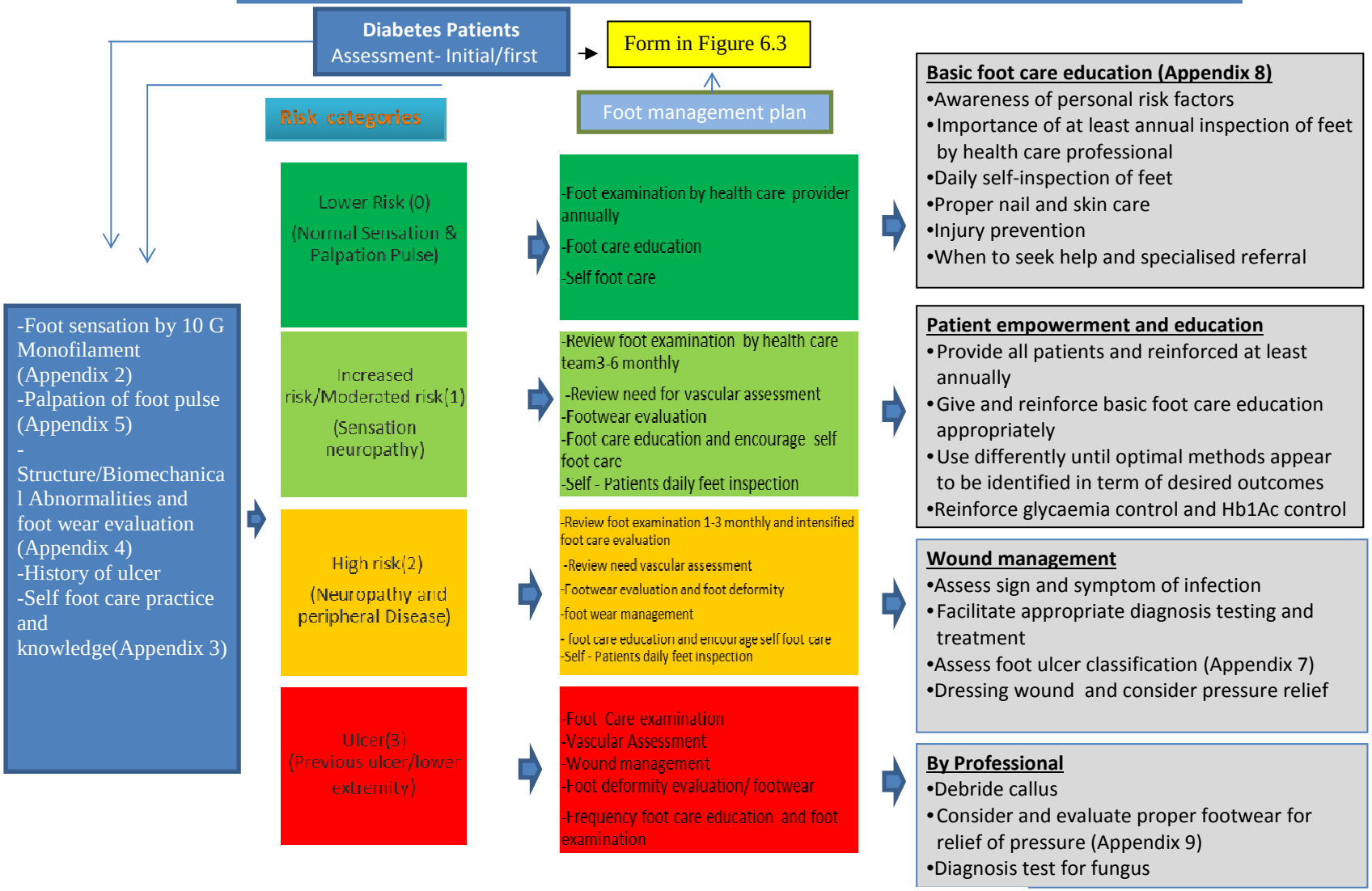
The findings from the second round have an overall agreement of between 94% and 100% in all statements, which were deemed sufficient for developing the foot care guidelines.

4.5 Final foot care guideline

Following Round 2 of the Delphi technique, the final guideline for foot care for diabetic patients was produced based on the expert panels' recommendations and agreement as shown in Figure 6.1. The guideline is mainly concerned with the management of the diabetic patients without foot problems, identifying diabetic patients whose foot may be at risk and the management of the ulcerated foot. The main feature of this guideline is that it is based on current national and international evidences and consensus of experts in diabetes management in Thailand.

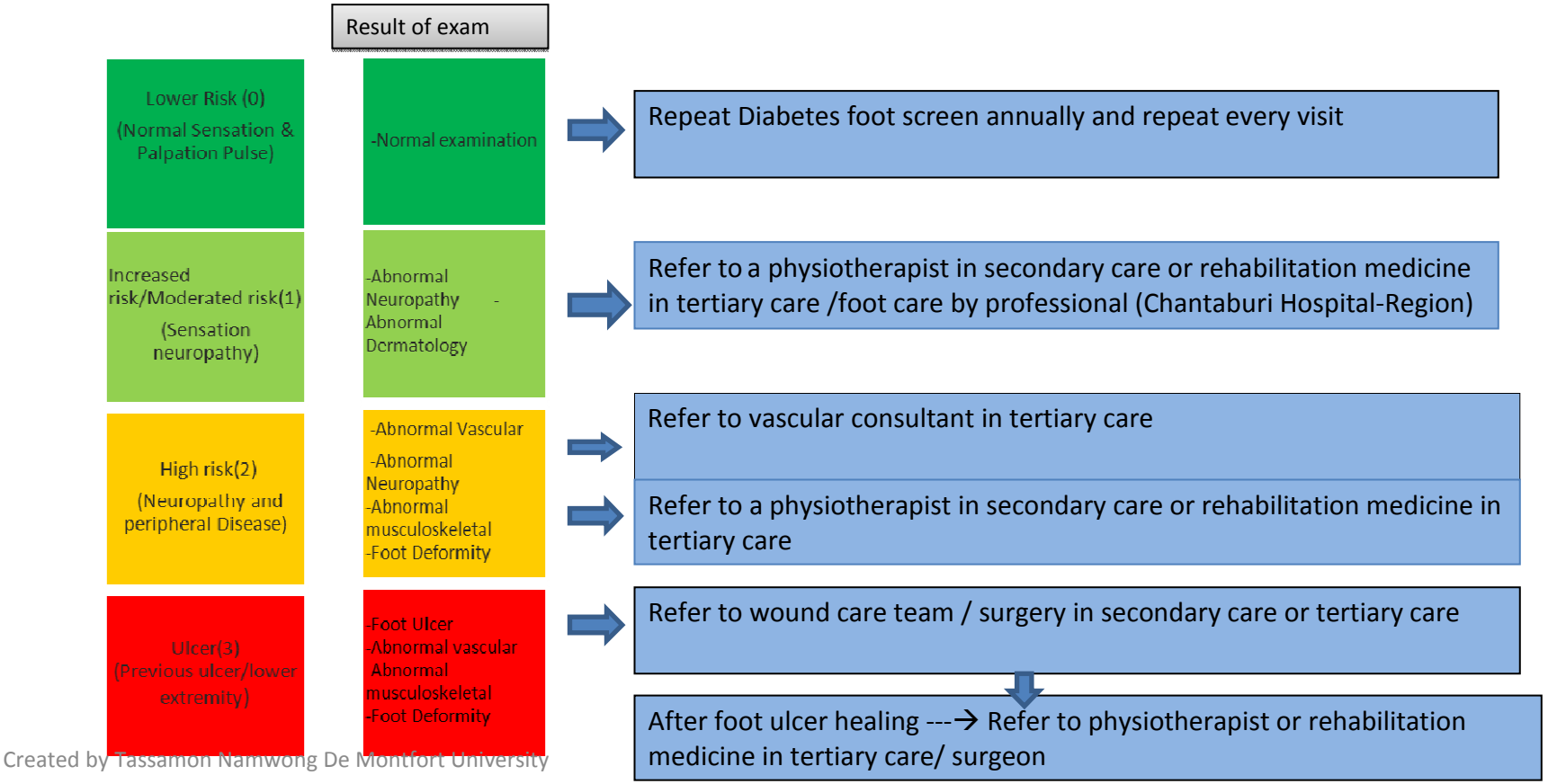
The guideline for the foot care of diabetic patients should be used for all diabetic patients. Following initial confirmation of their diagnosis, a foot assessment should be carried out using the guidelines (Figure 6.1). The patient should be categorised on the level of risk present. The risk categories are classified in four groups. In the 'lower risk category' the patient will have normal sensation and palpation, in the 'increased risk' or 'moderated risk' group, the patients will be experiencing sensation neuropathy, in the 'high risk' group, patients will have neuropathy and peripheral disease and in the ulcer group patients will have an existing foot ulcer or have had previous ulcer/lower extremity amputations.

Figure 6.1 Nursing practice guideline for foot care in Thailand, Province Chantaburi



Appendix 2 Use of the Semmes-Weinstein Monofilament
Appendix 3 Diabetes Foot Assessment/Risk Screening Guide
Appendix 4 Structural and Biomechanical Abnormalities Assessment and Guideline for Appropriate footwear Evaluation
Appendix 5 Location and Palpation of Pedal Pulses
Appendix 6 The Classification of four stage risk classification foot
Appendix 7 Grading a diabetic foot ulcer
Appendix 8 Care tips for the feet
Appendix 9 Guideline footwear for neuropathy

Figure 6.2 Diabetic foot care: Referral Algorithm in Thailand



Each category is linked to foot care management plan. The management plan for the 'normal' group is foot examination by a health care provider annually, foot care education, and self-foot care. Patients with 'an increased risk' or 'moderated risk' group should have their feet examined by the health care team 3-6 monthly, including vascular evaluation, foot care education and encouragement with self-foot care. The management for the 'high risk' group is foot examination every 1-3 month and intensive foot care evaluation, review of vascular assessment, footwear evaluation and foot deformity, footwear management and foot care education, including encouragement for self-foot care and self-patient daily foot inspection. The management plan for the 'ulcer group' is urgent referral to the specialist team in secondary/tertiary care for foot care examination, vascular management, wound management, foot deformity evaluation and footwear evaluation, and frequently foot care education.

The detail of management in each item in the guidelines is composed of:

1. Basic foot care education

- Awareness of personal risk factors–smoking, obesity, hypertension, diet
- Importance of at least annual inspection of the feet by a health care professional
- Daily self-inspection of the feet for changes,
- Proper nail and skin care
- Injury prevention by wearing appropriate footwear
- When to seek help and specialised referral from health care professional

2. Patient empowerment and education

- Provide education to all patients and reinforce at least annually using appropriate teaching method
- Give and reinforce basic foot care education appropriately
- Use differently until optimal methods appear to be identified in term of desired outcomes
- Reinforce glycaemia control and Hb_{1AC} control

3. Wound management

- Assess signs and symptoms of infection and treat as per local policy
- Facilitate appropriate diagnosis testing and treatment
- Assess foot ulcer classification using University of Texas tool
- Dressing wound and consider pressure relief–seek guidance from specialist nurse/professional

4. Foot care by professional

1. Callus debridement by physiologist
2. Consider and evaluate proper footwear for relief pressure refer to foot team
3. Diagnosis for fungus and treat as per local policy,

After assessment and categorisation of the risk patients, they should be referred to the relevant hospital for further interventions as shown in Figure 6.2.

Figure 6.3 Foot Assessment Form for Diabetes Patient

Patient Name……Hospital Number……..Date……

1.Duration of diabetes …… year Age of…….

-The last of blood glucose.....Hb_{A1C}…… Date……..

2.Neuropathy Assessment

- Hygiene of foot □ Good □ Poor
- Nail cutting □ straight □
- Skin colour**.....**
- Intrinsic muscle testing
- ANS skin- □thin □fragile □shiny , hair- □hairless □ normal
  nail □thick □too long □ingrown □ infected with fungal

	Left	Right
• Symptom painful neuropathy	□ Present □ Absent	□ Present □ Absent
• Presence of pain symptoms	□ In the feet □ In the calf □ Elsewhere	
Reduction of symptoms	□ Walking □ Standing □ Resting(Sitting or lying down)	

2.2 Sensory Assessment using 10 G Monofilament (Semmes-Weinstein) or electric device

Label sensory with '√' in feeling area and '×' in no feeling area

sensation

Present 1 2 3 4

Absent 1 2 3 4

Present 1 2 3 4

Absent 1 2 3 4

Conclusion Neuropathy □Present □Absent

3.Pulse Palpation

	Left	Right	PAD
• Dorsalis Pedis Pulse	□ Present □ Absent	□ Present □ Absent	□ Present
• Posterior Tibial Pulse	□ Present □ Absent	□ Present □ Absent	□Absent

4.Structural and Biomechanical Abnormalities	Left	Right
• **Callus**	□ Present □ Absent	□ Present □ Absent
• **Charcot**	□ Present □ Absent	□ Present □ Absent
• **Toe deformities**	□ Present □ Absent	□ Present □ Absent
• **Bunion**	□ Present □ Absent	□ Present □ Absent
• **Foot drop**	□ Present □ Absent	□ Present □ Absent

Foot Ulcer

-History of foot ulcer……..

-Ulcer Grade by University of Texas

-Current foot ulcer……

	Left				Right			
	0A	B	C	D	0A	B	C	D
I								
II								
III								

Footwear Assessment	Footwear Recommendation
□ Appropriate footwear	□ None □ Custom shoes □ Depth shoe
□ Inappropriate footwear…….	□Athletic shoe □ Accommodative inserts
5.Knowledge of foot care	Management foot care Plan
• Smoking □ Yes □ No	• Provide Basic foot care. Date……..
• Prior foot care education □ Yes □ No	Provide education about Hb_{A1C}or other self-care
• Demonstrate appropriate foot care □Yes □No	Date…….
Examination Summery	Refer to:
Low Risk □ (follow up 1yr)	□ Vascular Surgeon □ Surgery □ Nurse
At increased Risk □ (follow up 6 month)	□ Rehab Specialist □ Nutritionist □ Dressing
At High Risk □ (follow up 3 month)	□ Physiologist □ Other……
Foot Ulcer □	
Next follow up visit. Date……..	Recorded by……..

(Modify from Phrapokkloa Hospital foot assessment form, Thiti Prabnasak 2008 Form)

For guidance on how to carry out all the procedures on this form, please consult the nursing guidance.

5. Discussion

The aim behind developing the guideline was to offer consensus statements which were based on a review of the literature, using Soukup's (2000) framework and the opinions of researchers and clinical experts in Thailand in the field of diabetes.

The Delphi technique was the most appropriate and acknowledged model for developing consensus guidelines, as discussed in Chapter 2 (Section 10). This methodology is appropriate to gain expert opinion consensus from those who are practitioners. The expertise of the panel provided rich data sources that were used to redesign the guideline in Round 2 and ultimately the final guideline.

The initial responses rate of 96% from the panel of experts was a good response and strong cut off point. The reviewed second response rate in the Delphi technique for maintaining rigor was at least 70%, which is robust as indicated by Bork (1993), Walker and Selfe (1996) and Sumsion (1998). The robust inclusion criteria used to select the panel included multidisciplinary health care practitioners from clinical practice that greatly contributed to the expertise and knowledge in developing the guideline.

Two rounds of the Delphi technique were sufficient to gain a consensus agreement of 94-100% to formulate the foot care guideline. The foot care guideline was underpinned by the following principles that:

1. All diabetic patients should be assessed for neuropathy and the risk to their feet

2. Identify the category of risk which was present

3. Select appropriate referral and treatment based on evidence

The questionnaire for Round 1 was developed using evidence from the national guidelines in Thailand and international research studies (IWGDF 2007, NICE 2004, RNAO 2004). The evidence came from a randomised control trial, well-controlled design studies without randomisation, well designed quasi-experimental studies, descriptive studies and expert committee reports. The evidence–based practice model of Soukup (2000) was used as the conceptual framework in developing the guideline. The four phases: evidence-trigger phase, evidence-supported phase, evidence–observed

phase and evidence–basesd phase were conducted to develop recommendations and statements in the nursing foot care guideline. The Soukup spiral framework supported practitioners in solving clinical practice problems in a systemic way that combined various disciplines for the best practice across the care continuum (Soukup 2000). The panel also had knowledge of current practice and the members were aware of the socio-political, cultural and health care policies in Thailand.

The consensus guideline was underpinned by the current management of neuropathy, vascular disease and foot care. Moreover, based on the risk categories patient management can be prioritised using the referral system for each group. The goal of the guideline was to achieve consensus so that there is consistency in the strategies of prevention, diagnosis and treatment of diabetic foot complications.

The foot care guideline aimed to prevent foot complications by requiring health care practitioners to examine and inspect patients' feet, classify the level of risk and the subsequent management for patients in each risk group. Several studies (Lavery et al. 2005, Meijer et al. 2001) have shown that effective foot care management reduces the amputation rate. Lavery et al. (2005) used a programme of screening and treatment in diabetic foot disease management and dramatically reduced the amputation rate in diabetic patients. The rate of amputation decreased 47 % from 12.89 to 6.18 per 1000. Meanwhile, Meijer et al. (2001) used a screening programme to prevent diabetic foot complications.

The key elements in the foot care guideline included dermatological inspection, musculoskeletal and neurological assessment, vascular assessment, risk classification and referral/ follow up.

Four risk categories of 'lower risk', 'increased risk', 'high-risk group' and 'foot ulcer or amputation' have been identified as suggested by IWGDF (2007) and NICE (2004). Peters & Lavery (2001) reported that using four groups for risk categories predicted ulceration and amputation.

The follow-ups and referrals for each risk group have been identified as every 1-3 months in the risk category 'foot ulcer history' 3-6 months in the 'high risk' group, 6 months in the 'increased risk' group and 1 year for the 'lower risk' group. The

recommendation for frequency of check-ups follows the guidelines set by the American Diabetic Association (ADA 2008) guideline and IWGDF (2007) and is supported by the findings from the Delphi technique.

The classification of diabetic foot wound in this guideline was addressed using the University of Texas Wound classification System. Armstrong et al. (1998) stated that using the University of Texas Wound Classification System predicted amputation incidence and reported the increased prevalence of amputation related to the increasing depth and stage of wounds.

The foot care management guidelines clearly outlines the referral system to be used when there is a threat to a limb.

If the recommendations are followed for all diabetic patients, the improved management should result in a reduction of foot complications in diabetic patients. Thus it can be argued that a reduction in foot complications and reduction in referral to secondary and tertiary hospital will reduce the amputation rate and incidence of foot ulcer. The final guideline (Figures 6.2, 6.3) will be piloted in a health care setting in Thailand. The implications of implementing the guidelines in practice will be discussed in the next chapter under the following headings: policies, practice and education.

5.1 Reflection analysis of the quality in this nursing practice guideline

There are many appraisal tools which can be used to explore clinical practice guidelines (Vlayen et al. 2005). It was stated by the National Health and Medical Research Council (NHMRC 1998) that the best approach for developing guideline work would be a mixture of strategies that are suitable for local conditions and are developed in concert with local clinicians, consumers and managers. Moreover, a systematic methodology in order to retrieve evidence to support the guideline format is an approach employed in this research project. The AGREE instrument is accepted as the gold standard for guideline appraisal (Graham and Harrison 2005), an approach supported by Vlayen et al. (2005). Therefore, the quality of nursing practice foot care guideline was evaluated using the AGREE II instrument because this serves as a basis for evaluating the methodological quality of any guideline (Vlayen et al. 2005) as well as assessing the

process of guideline development (Graham and Harrison 2005). This validated and transparent instrument has been widely accepted and internationally developed.

This AGREE II instrument evaluated the guideline in six domains which this current guideline followed (as shown in the Table 6.3 below). This step of evaluation was confirmed and debriefed between the researcher and two academic experts (8 and 10 in Appendix 3) in order to reduce the bias of evaluation.

Table 6.5 The result of evaluating the current practice guidelines by use of the AGREE II instrument (2009)

Item and Domain	Response Scale						
	1	2	3	4	5	6	7
	Strongly disagree						Strongly agree
Domain 1 Score and purpose							
1.The overall objectives of the guideline are specifically described							✓
2.The health questions covered by the guideline are specifically described							✓
3. Three populations (patients, public, etc.) to whom the guideline is meant to apply are specially described.							✓
Domain 2 Stakeholder involvement							
4. The guideline development group includes individuals from all relevant professional groups							✓
5. The view and preferences of the target population (patients, public, etc.) have been sought							✓
6. The target users of the guideline are clearly defined							✓
Domain 3 Rigour of development							
7. Systematic methods were used to search for evidence.					✓		
8. The criteria for selecting the evidence are clearly described.					✓		
9. The strengths and limitations of the body of evidence are clearly described.				✓			
10. The methods of formulating the recommendations are clearly described.			✓				
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.				✓			
12. There is an explicit link between the recommendations and the supporting evidence.			✓				
13. The guideline has been externally reviewed by experts prior to its publication							✓
14. A procedure for updating the guideline is provided						✓	

Domain 4 Clarity of presentation				
15. The recommendations are specific and unambiguous.			✓	
16. The difference options for management of the condition or health issue are clearly presented.			✓	
17. Key recommendations are easily identifiable.				✓
Domain 5 Applicability				
18. The guideline describes facilitators and barriers to its application		✓		
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.				✓
20. The potential resource implications of applying the recommendations have been considered.		✓		
21. The guideline presents monitoring and/or auditing criteria.		✓		
Domain 6 Editorial independence				
22. The views of the funding body have not influenced the content of the guideline.				✓
23. Competing interests of guideline development group members have been recorded and addressed.				✓

The first part of domain one of AGREE II, score and objective, was examined. The objective of the guideline is to provide foot care management in order to prevent foot complications in diabetic patients. This guideline provided detailed descriptions of the health benefits relevant to specific clinical problems. This guideline specific focused largely on dimensions of prevention and screening foot complications of type 2 diabetic patient populations. It is similar to NICE (2004) and IWGDF (2007) strategies. However, this objective, in comparison with RNAO (2005), included a general statement of care provision to be available in all health care settings for both type 1 and type 2 diabetic patients. In addition, the objective in this study was not specific about the expected health benefits. It can be suggested that the guidance in this study was quite narrow, largely relating to type 2 diabetic patients and designed principally to cater for foot care and risk analysis in this group. The predominant risk factors between type 1 and type 2 do differ regarding age, peripheral vascular disease, neuropathy, duration of diabetes, smoking, renal disease and foot deformity (NICE 2004).Therefore, this guideline is useful directly for type 2 diabetes patients, which is the most illness population in Thailand (Aekplakorn et al. 2003). In addition, this guideline might be useful for type 1 diabetes because risk factors of foot complications are similar to the type 2 diabetes patients. Moreover, this guideline also explained the scope of guideline,

target population, the expected intervention and practice, as well as the outcomes and health care setting.

The second domain in this instrument is stakeholder involvement (ARGEE 2009). This current nursing practice guideline was provided by the group members involved in the consensus forming exercise of the Delphi technique. Information about the panel experts, including name, discipline, content expertise, institution, and geographical location, was provided (see Appendix 3). Moreover, information of the target population's experience was explained in the process of developing the current guideline. The discussion showed the method by which preferences and views were sought, particularly the participation in the guideline development group and evidence from the literature review. Therefore, it is evident that this current guideline showed that the views and preferences of the target population have been sought and used. However, the outcome for patients was not clearly defined, but it is well designed to give guidance for nurses, and for this group it is likely to be appropriate.

There was strong agreement as to the target users for this current guideline: nurses, specialist foot care nurses and advanced practitioner nurses. This showed the clear description of intended guideline audience. In addition, a description of how the guideline may be used by its targets of nurses to inform standards of care and clinical decisions was addressed.

The third domain of AGREE II involved assessment of the rigour of the guideline development (Brouwer et al. 2011). It is argued by Graham and Harrison (1995) that the rigour of development of clinical guideline illustrated and informed the validity of content in their guideline. The current guideline utilised a systematic method of evidence searching from diverse databases such as MEDLINE, CINAHL and PsychINFO and the searching period and the search terms used were provided in the guideline. The items of systematic method were evaluated at a score of five out of seven.

The criteria for selecting the evidence for this current guideline were described in the inclusion criteria including the study design, outcome, and comparison with the target group of diabetic patients who have foot complications. Inclusion and exclusion criteria

were provided, however; description of criteria was not clearly in the step of developing process. This item therefore was evaluated with a score of five out of seven.

The issue of the strengths and limitations of the body of evidence are clearly described in this current guideline. Although, the exclusion and inclusion criteria were provided in the literature review, most of evidence in the nursing guideline developing process was based on the exiting clinical guideline from other countries. There was a limited body of evidence. However, not all evidence was accessed via the researcher; some was confirmed by consensus of the group members. This is different from the guideline of Barker and Burns (2001) that used the group of experts to interpret their evidence. Nonetheless, Graham et al. (2005) found that the process of interpreting literature with panel member was not essential for all new guidelines development. Most guideline studies describe the study design, study methodology, limitation, applicability of practice and the accumulated results across studies. Interestingly, the current guideline considered the relevance of both primary and secondary outcomes. The GRADE method was used in this current guideline and description of each recommendation. However, the original evidence is not given in any of the tables. Therefore, this item was evaluated with a score of four out of seven.

The step of developing recommendations was used according to the classical Delphi technique and a minimum consensus of 85% was achieved in each round. The result of the Delphi techniques was reported in this current chapter. Therefore, the level of agreement in this item was given a value with the score of three out of seven. As a result, formulating each recommendation was not clearly referred to the evidence.

The item relating to the health benefits, side effects, and risks has been considered in formulating the recommendations. This current guideline described the body of evidence which supported data and reported the risks of foot ulcers and the benefit of appropriate footwear. Recommendations were considered that focused on both beneficial and harmful effects. However, the limitation of time available to this researcher dictated the small amount of evidence in some of the recommendations. Therefore, the evaluation of this item was given a value of four of seven, as the amount of evidence could be insufficient in some recommendations and could be better described.

The next item addressed an explicit link between the recommendations and the supporting evidence; the current guideline used a wide range of evidence to inform the recommendations. Although, each recommendation was linked to evidence summaries, with evidence tables being presented in the results section of the guideline, it was not clearly described in final stage in this guideline. The score of this item was three out of seven.

The external experts reviewed the guideline prior to its publication. The current material that constitutes the guideline has been externally examined by the 20 panel experts around Thailand, in order to improve quality and receive the feedback on the draft of recommendations. This item was scored positively at seven out of seven.

Updating guidance was part of the procedure of developing this current guideline, based on the Soukup framework (2000) and was explained in the process of the formation of the clinical guideline. The methodology of the Soukup model was a widely supported process to be used for an updating procedure (Burns and Grove 2005). This item was at score of four out of seven.

The fourth domain of the instrument was clarity of presentation. This domain examines whether the recommendations are specific and unambiguous. Most recommendations in this current guideline related to statements of action. All the recommendations are designed to improve the quality of the patient's life and enhance the prevention of foot ulceration. This current guideline defined and examined the recommendations by explaining the process of developing each statement. Each recommendation was supported with evidence in the interpretation and discussion sections. However, there are some parts of recommendations that were vague; supporting evidence was inadequate. However, this item was scored quite positively at six out of seven.

The next item was the different options for management of the condition or health issue. This item is clearly presented. This current guideline described the options for foot ulcer management and foot care education. Both recommendations were clearly presented in the area of foot ulcer management, for example, how to assess signs and symptoms of infection and facilitate an appropriate diagnosis Therefore, this item was given a score of six. It is not scored at level seven because of the paucity of attention to foot ulcer treatment. It is similar to the component of the guideline of RNAO (2004) which did not

provided information concerning the treatment of foot ulcers because of the nurse's role. The aim of this current guideline is to address prevention of foot ulceration and further foot complications, the philosophy of prevention rather than cure was followed.

Regarding the issue of 'key recommendations are easily identifiable', this current guideline was scored at the level of 'strongly agree (seven)'. There is a description of recommendations in a summary box. The recommendations are grouped together in the same sections as foot ulcers and foot examination.

The fifth domain in the AGREE instrument is applicability, which consisted of four items. This guideline described the existing facilitators and barriers that will impact upon the application of the guideline's recommendation. The score of this item was at the neutral agreement level (four).

The item of assessment of applicability related to a tool or advice that was provided, with particular reference to the tools of foot examination in the guideline (in Appendix 6). There are documents for guiding how to examine a diabetic patient's feet as well as the procedure of assessment by use of a monofilament. Tools for assessing appropriate footwear, as well as other aspects of patients' foot risk, were provided in Appendix 6. The score of this item is at the 'strongly agree' (seven) level.

Items relating to resource implementations, as in applying the recommendations, have been considered. This process of implementation in this current guideline was not identified in this time. The score of this item was four out of seven (neutral), indicating the guideline may require revising.

The item involving evaluation addresses whether the guideline presents monitoring and/or auditing criteria. This current guideline provided information relating to follow up time. There is no clear clinical outcome measured. This accounts of a score of four out of seven, the neutral mid-point. The outcome of foot examination was not provided in the criteria of using the guideline.

The last domain of AGREE II is editorial independence. This guideline was developed by the researcher, who was not employed by a manufacturer or drug company; the researcher therefore had editorial freedom, which had not, in any way, influenced the content of the guideline. The score of this item was strong agreement (seven).

The last item of AGREE II related to the requirement that the competing interests of guideline development group members have been recorded and addressed. This current guideline stated that this would apply to a member of the development group whose research on the topic was covered by the guideline. The score of this item was at the 'strongly agree' level (seven).

In conclusion, the finally score of the guideline evaluation, employing AGREE II (2009) instrument, was 132 out of a possible 161 (the total if all items had been 'fully agreed'). A score of 132 indicates that this guideline is supported at 81.98% level, which easily beats the minimum quality criterion of an acceptable score in AGREE instrument $\geq$ 70/100 (Graham and Harrison 2005). This current nursing practice guideline should be revised, when considering responses to such issues as resource implication and monitoring/ auditing in the guideline. This issue should be further implemented in any future research.

5.2 Comparison with other clinical practice guidelines for foot care

In an attempt to assess the differences and similarities between the clinical practice guideline of foot care with existing foot care guidelines, findings were compared with data from the RNAO (2004), NICE (2004) and IWGDF (2007).

The objective of the nursing practice guideline in this current study is to promote foot management and foot care for type 2 diabetic patients. This aim is similar to IWGDF (2007) and NICE (2004). Meanwhile, RNAO (2005) provided the directions for nursing care to both type 1 and 2 diabetic patients who have diabetic foot ulcers.

The scope of this current nursing guideline is to provide information about the nurses' role in foot care management in order to prevent foot ulceration and amputation; aims that are similar to the guidelines of NICE (2004) and IWGDF (2007). Moreover, this current guideline is designed specifically for use in the foot care clinic in hospitals that have a multidisciplinary foot care/ diabetic team. The MDT described in this guideline was portrayed differently from the guidelines of the NICE (2004) and IWGDF (2007). The current team members consisted of a medical doctor, surgical doctor, rehabilitation doctor or physiotherapist, nurse and nutritionist only; there are no podiatrists in Thailand as a result of budget restrictions from the government. This team composition

is in contrast to the MDT in NICE (2004), IWGDF (2007) and RNAO (2005) that involved podiatrists, doctors, special nurses and physiologists. Moreover, this guideline differed clearly from NICE (2004) which did not state exactly where the MDT should be based or what components make up such a team (Foster 2004). Therefore, the resources required for developing these nursing practice guidelines were more modest.

In addition, the target group of this current nursing practice guideline was medical professionals providing foot prevention for type 2 diabetic patients in hospital. This is similar to the target groups of NICE (2004) and IWGDF (2007). In contrast, the RNAO (2004) guideline was directed at providing foot care for patients both type 1 and type 2 diabetic patients.

In this new guideline, four levels of risk were considered when assessing the issue of diabetic foot with type 2 patients: 1) lower current risk, 2) increased risk, 3) high risk and 4) the ulcerated foot. These four levels of risk are similar to those of NICE (2004). In contrast, the guideline of RNAO (2004) split the level of risk into two groups: lower risk and higher risk. Similarly, the guideline of IWGDF (2007) and IDF (2005) guided the standardised classification of four levels using different definitions. The effectiveness of a four level risk classification of IWGDF was explored by Peters and Lavery (2001) whose findings showed that the IWGDF risk classification both predicted and prevented foot amputation in the duration of the 3 years follow up. The risk classifications of IWGDF (2007) and IDF (2005) clearly classify risks for the development of foot ulcers, while RNAO (2004) used the broad general criteria of lower and higher group risks. Furthermore, there is evidence to show that the various risk classifications significantly predict and differently prevent foot problems (Lavery et al. 2008). The study of Fujiwara et al. (2011) applied a foot care programme tailored to four distinct risk groups, significantly decreasing foot complications .Therefore, it is seen that classification of risk combined with clear definitions helps to guide the properly foot care management and foot education.

The foot ulcer classification in this current nursing practice guideline was informed by the system of the University of Texas, based on the literature review and the consensus of the expert panel. The present system of classification is similar to the guidelines of RNAO (2004), NICE (2004), IDF (2005) and IWGDF (2004). The effectiveness of the foot ulcer classification of the University of Texas resulted in the outcome, as reported

by Prentice et al. (2009), that the wound status of patients with foot ulcers showed a significant reduction in the number of wounds at time two and time three. The researchers also reported the grade of wound at time two and three had improved. It seemed that using the Texas classification improved the severity of foot ulcers as well as induce cost of foot treatment.

The interesting difference of this current nursing practice guideline from earlier guidelines is the form of foot assessment. The current guideline provides information about the monofilament test, footwear assessment, foot deformity assessment of neuropathy and manual assessment of foot palpability. Conversely, the existing guidelines lack details of clear footwear assessment (NICE 2004, RNAO 2004) as well as foot deformity assessment (IWGDF 2007, NICE 2004). Therefore, the standardised form of evaluating the appropriate footwear for diabetic patients and the risk screening assessment form were developed in this current study.

Furthermore, this new nursing guideline was based on and incorporated the knowledge and experience of Thai experts who were familiar with Thai culture and the health care system. The referral system for diabetic patients in this current study is clearly framed in the context of a developing country. For example, patients who have a foot deformity, such as claw toe or Charcot foot, were referred to a physiotherapist or a rehabilitation doctor instead of podiatrists, as recommended in the UK and US guidelines. Edwards et al. (2007) showed that a recommended referral system should be provided in the guidelines and indicated the positive impact of implementing six of RNAO's best practice guidelines on nurse's familiarity with patient referral practice and referral resources. In addition, most practice guidelines recommended that nurses facilitate referrals or seek an urgent medical referral in guidelines relating to adult asthma care, delirium, and smoking cessation, showing that nurses' familiarity with these resulted in a statistically significant increase in resources for all best practice guidelines and self-reported referrals to specific services. It is apparent that a special recommendation for referral should be included in the nursing practice guideline in order to initiate referral and tailor supporting appropriate patients (Edward et al. 2007).

The best method of developing a clinical guideline that works is arguably the mixed strategies approach (NHMRC 1998). In literature, there are existing guidelines developed by panel experts and identified in the literature review (Rolley et al. 2010,

Barker and Burns 2001, Morita et al. 2005). The guideline in this current study was based on not only local expert opinion but also the experience and knowledge of diabetic patients, nurses and educators. This researcher was unable to show any evidence that foot care guidelines for diabetic patients had previously been developed by incorporating interview data from three groups of stakeholders: nurses, educators and patients. The core component of this guideline was patient-centred and patients' self-efficacy in foot care management. By using it patients will be encouraged to undertake foot self-care, including getting help from his or her family. In addition, patients and caregivers will be encouraged to collaborate with each other and share agreement and responsibility of diabetic foot disease management. There is the evidence in the literature showing that encouraging the self-efficacy of diabetic patients will promote significant improvements in foot care behaviour and foot care knowledge (Corbett 2003, Quarles 2005, Krichabaum et al. 2003) as well as decreased incidence of foot ulceration in patients in the group at risk group of developing neuropathy problems (Calle-Pascual et al. 2002).

This new guideline used the Delphi technique, with 20 experts who specialised in diabetes or diabetic foot care. By comparison, the NICE guideline on foot care for patients with diabetes (2004) was based on an extensive literature review and expert opinion. Although NICE (2004) used experts, it was limited by a lack of evidence from prospective double-blinded researches and a lack of consensus in experts' opinion in several key issues such as the optimal referral pathway, effective foot ulcer management, no clarification concerning MDT membership and mission of any detail concerning nurse training (Foster 2004).

In addition, the RNAO (2004) guideline of nursing for prevention of foot complications used a specialist panel and a structured evidence review to develop their existing guidelines. The panel consisted of the previous original members and recommended individuals who are experts in the practice area. The experts, 10 specialist nurses from around Ottawa, were assembled to review the original guideline in order to develop and then issue a new set of guideline and to confirm the validity and appropriateness of all recommendations. The IWGDF (2007) developed their guideline using a synthesis of evidence and expert opinion. The representative group consisted of health care professionals specialising in dealing with diabetes, others from diverse disciplines and

non-government personnel from the International Diabetes Federation region, which involved countries with different economic levels (IDF 2007). Each section of draft guideline was designated to focus on an area of individual expertise. The first guideline was developed in 2005, and was facilitated by the diversity of available experts and financial resources available among developed and developing countries. Most published national guideline come from resource rich countries; those nation's guidelines are of only limited in practical use in less resourced countries.

This new guideline was developed by this researcher; all components were based on data from evidence and culturally relevant professional opinion that were unhampered by time and financial limitation. In additional, it was developed using the Delphi technique. Component key areas were formed from the consensus of expert opinion such areas include the referral pathway, MDT membership, details of nurse training and foot ulcer management. This composition is different from the NICE (2004) guideline in that this current guideline contains additional practical evidence that can be used for patients with foot ulcers.

It is unique as the guideline was developed by using information gathered from the local specialist expert opinion. This guideline is likely to be suitable for Thai people and in Thai cultural contexts. For instance, there is specific point about the cultural issue of using footwear inside the building. Thai people traditionally only wear shoes when going outside house such as going to the market, school, and post office. Sport shoes will be only used when playing sports. In the global guideline, NICE (2004), IWGDF (2007) and RNAO (2004) suggested the appropriate footwear includes wearing sports shoes as the protective footwear helps reduce ulceration and protects injuries by an accident. According the experts' opinions at the level of confidence, the appropriate footwear of Thai culture should be shoes which cover the toe and/or sling back shoes than the sandal shoes and sport shoes.

5.3 Comparison with other Delphi technique variants in developing guidelines

The Delphi technique provided an appropriate forum for the expert panel. It also supported the validity of the consensus process. This was supported by both the Soukup framework and literature review. The guideline is a result of systematic analysis of the

theme of foot care management, as well as consensus from the panel of expert, providing credible and valid information (Chang et al. 2010).

Purposive selection of panel members was the mode used in this study. In addition the process of setting criteria, the inclusion of panel experts, and selecting from academic, clinical, management and community cohorts in rural and metropolitan Thai settings, ensured that the panel was representative and diverse. Moreover, members possessed a wide range of knowledge and experience about diabetic foot care management. This situation is similar to the study of Chang et al. (2010), in which 16 experts from different positions in metropolitan and rural areas were used to systematically review the APN Role Delineation tools and validate those tools.

The method of communicating via post, without face to face meetings between the researcher and experts was user-friendly and allowed the selected panel members to express their experiences, views and comments (Chang et al. 2010). This tactic did however result in some delays in responding due to work overload experienced by the experts. However, non-face-to-face questionnaires were effectively followed up by the researcher using post and telephone communication, which elicited a higher response feedback from experts. Likewise, the study of Chang et al. (2010) received 100% feedback.

In addition, the design of the first round of the Delphi technique utilised a structure first round in the reactive Delphi style (Keeney et al. 2011). It enabled progression from the foundation work on foot care management for nurses in Canada (RNAO 2004), and the initial research on the foot care management of nurses in Thailand. There are many risks of bias or limited response with the Delphi technique (Hardy et al. 2004, Chang et al. 2010), since the researcher does not know the rationale behind the responses and there is limited opportunity for researcher and panel members to elaborate on their views (Goodman 1987, Keeney et al. 2010). Therefore, to counter this shortcoming, participants were allowed to express their view freely with comments at each stage (Keeney et al. 2006).

All questionnaires and responses, including those that were anonymous in the response documents, were shared with panel members to promote open discussion and offer the chance to change their opinions in order to achieve appropriate agreement. This method

was similar to the one employed in the studies of Chang et al. (2010), Jirwe et al. (2009). This method of controlled feedback gave participants opportunities to change their opinions after reviewing the other anonymous responses and facilitated development from previous research (Keeney et al. 2006).

5.4 A discussion of this approach to guideline development

This new guideline was not founded on an in-depth analysis of medical treatment of foot ulcer. Instead the literature review focused on the prevention of foot ulceration and foot amputation. The development programme of this guideline used a group of 20 experts specialised in foot care fields backed by information and interview data from diabetic patients, nurses and educators in local areas, therefore used a broad selection of expertise to support its practice related findings. Furthermore, this guideline was developed for use within the setting and context of a local group. Meanwhile, wider literature sources including diabetic foot ulcer treatment, such as the guideline for diabetic foot ulcer by Murphy et al. (1998), were not considered in the process of developing of foot care treatment in this current guideline. This therefore, is a limitation; a wider literature review and possibly a greater number of experts would be of benefit in future research.

In addition, although this guideline was developed to assist and support nursing care, it may also be useful to other health care professionals who may be involved in the initial, as well as advanced, foot management. It is important that this research be viewed as a point of departure and that in the future a further wider literature search includes both type 1 and type 2 diabetic foot ulcer treatment that has been undertaken in a range of populations and settings.

5.5 Limitations in developing the guideline

When the Delphi technique had progressed to the point where participants wrote few comments and did not generate any new information leading to the development of new categories of information, this was considered time to cease the Delphi rounds; a critical decision point discussed by Hasson et al. (2000).

Participant's comments or opinions ranged across the topics of foot examination such as the site test of monofilament and the number of sites that monofilament test should be done on, but a high level of consensus was always arrived at. Because the guideline was based on a literature review and was refined using a panel of experts the result was suitable, culturally appropriate. This strategy is confirmed by Grimshaw et al. (1995) who identified that the review process possessed optimal validity because it identified, synthesised, and interpreted evidence systematically. The researcher in this study made the recommendation to follow up the evidence based on updated knowledge from contemporary literature, rather than relying on the potentially outdated knowledge of experts; a view also supported by Grimshaw et al. (1995). Although local experts may lack the resources and skills needed to develop a foot care guideline, local workers must be used as experts in order to take account of the increasing acceptability and relevance of a guideline that has been locally developed.

5.6 Foot care management

This guideline for foot care management will be used for preventing and managing foot care practice for diabetic patients. It is intended that it will be used by nurse practitioners who are involved in foot care management in the hospital setting. In addition, it will enhance the detection of the early stage of diabetic foot ulceration as this is a specific component that is included in the risk assessment. For instance, previously the symptom of claudication was not assessed by nurses in Thailand. In this study, the researcher designed the nursing practice guidelines for the preventive of foot complications based on the Canada Foot Care guidelines of RNAO (2004), NICE (2004), IWGDF risk classification (2007), and Peters and Lavery (2001). This current guideline refers to the process of foot examination using the format of monofilament and vascular assessment, assessing the risk of developing foot ulcer and categorising risk levels, appropriate footwear and foot care procedures.

5.7 Refinement of the guideline and the role of advanced practitioner nurse

There were some comments made by participants in the first round of the Delphi technique related to educational issues of health care professionals. The participants stated that, although some nurses were trained in foot care management and nurses

routinely performed foot examination in the foot clinics, they were not required to perform other advanced duties such as foot risk classification and wound care. Some of them did not make referrals nor do advanced practice foot care such as trim calluses or assessment of peripheral vascular disease. This observation describes a situation similar to that of Canadian nurses, who implemented diabetic foot care without having specific educational training to enhance their health professionals' caring behaviours (Canadian Nurse Association 2004). Although a short term course was provided for nurses, diabetic foot care alone was considered ineffective in foot ulcer prevention (Aalaa et al. 2012). Similarly, some participants in this study emphasised that nurses who had received only the short course training were unable to provide appropriate foot care practice for their patients. As a result, it is reasonable to suggest that short term training could be developed to provide more focus on diabetes and foot care (Aalaa et al. 2012). This could be through continuing professional development, or recognised academic courses such as a masters level module.

The findings in this study showed that nurses provided the minimum standard of foot care, an outcome similar to the study of Fain and Melkus (1994) that indicated that nurse practitioners were not consistent in following the prescribed standard of diabetic care. Nurses complained that there were many diabetic patients they were obliged to monitor and many jobs that had to be done. It seemed that the complexity of the nurses' role and responsibility impacted on the practice of that role, particularly hindering the provision of a minimum standard of foot care. This describes a situation similar to the findings reported in the literature, including time constraints, as well as shortage of staff (Ritchie and Prentice 2011). Therefore, it is reasonable and indeed necessary to suggest that the status of specialist practitioner nurses for foot care, and also advanced practitioner nurses, should be reviewed and promoted in the health care system.

The advanced nurse practitioner can play an integrated role in education and the medical management of people with diabetes, in particular relating to the specialised field of diabetic foot care management (Conlon 2001). In foot care management, the roles of nurse practitioners and advance practitioner nurses is not only to provide foot screening and examination, to design appropriate foot treatment and to complete the patients' standard foot care education, but also to identify different types of devices to maintain a patient's mobility (Aalaa et al. 2012). In addition, the advanced practitioner

diabetic nurse can prescribe and adjust medication through prescriptive authority (Spollett 2003, Piaseu et al. 2013), independent roles to prescribe medication including giving adjunct service under advanced nursing practice certification. Spollett (2003) identified that the advanced practitioner nurse had a significantly contributory role to improve type 2 diabetic management especially through diabetic foot care programmes, rather than via general nurses or bachelor's degree nurse (Flood 2009).

It has been shown that the number of advanced practitioner diabetic nurses in Thailand has increased (Boontoung et al. 2000, Hanucharurnkul 2007); however the effectiveness of such advanced practitioners has not been reported and the incidence of foot complications has been shown to have dramatically increased (Rerkaserm et al.2004). It has been suggested that the role of advanced practitioner nurse in Thailand is limited to the authority of their nursing role, payment policy, and the complexity hierarchy of the health care system, as discussed in chapter one (Hanucharurnkul 2007, Piaseu et al.2013). These are similar finding to Naylor and Kurtzman (2010). As a result, the advanced practitioner nurses program was closed in 2010 (Piaseu et al. 2013).

In Thailand, the nurses did not practice their standard roles and provided only foot assessment and foot education at first diagnosis, a limitation imposed by their insufficient knowledge and heavy work overload. These findings are similar to those of Flood (2009), Ritchie and Prentice (2011) who noted that nurses were unsure of the patient and families' capacity to follow through treatment recommendation offered to them. Similarly, nurses perceived diabetic foot care as not being a high priority in their list of responsibilities (Flood 2009). The decision-making role of the nurse and the quantity and quality of interaction between nurses and patients were disregarded. The role of prescribing and the adjustment of medication in this study was considered by the doctor. It seemed that the process of care was not clarified, as shown in the finding that the majority of nurses did not feel confident to assess the stage of diabetic foot and to apply foot care.

Chapter Seven: Policy, Practice and Educational Implications of Research

1. Introduction

The main achievement of this research has been the conceptual and methodological development of the foot care guideline. Research strategies were developed for investigating what knowledge practitioners and patients had in the management of diabetes in practice and whether a more systematic approach to the management of patients was necessary in order to prevent foot complications. The information has been presented in the foot care guideline (Figures 6.1, 6.2 and 6.3) and was an important development of the research. The main headings and subheadings used in the flow chart were based on current evidence data from the international literature of diabetic foot care management and the focus group consensus. It is anticipated that as practitioners use the guideline, they may wish to modify aspects of practice as a result of new research and organisational changes.

This chapter will discuss the implication of this research under the following three main heading: policy implication, nursing practice implication and nurse education including continuing professional development.

2. Policy implication

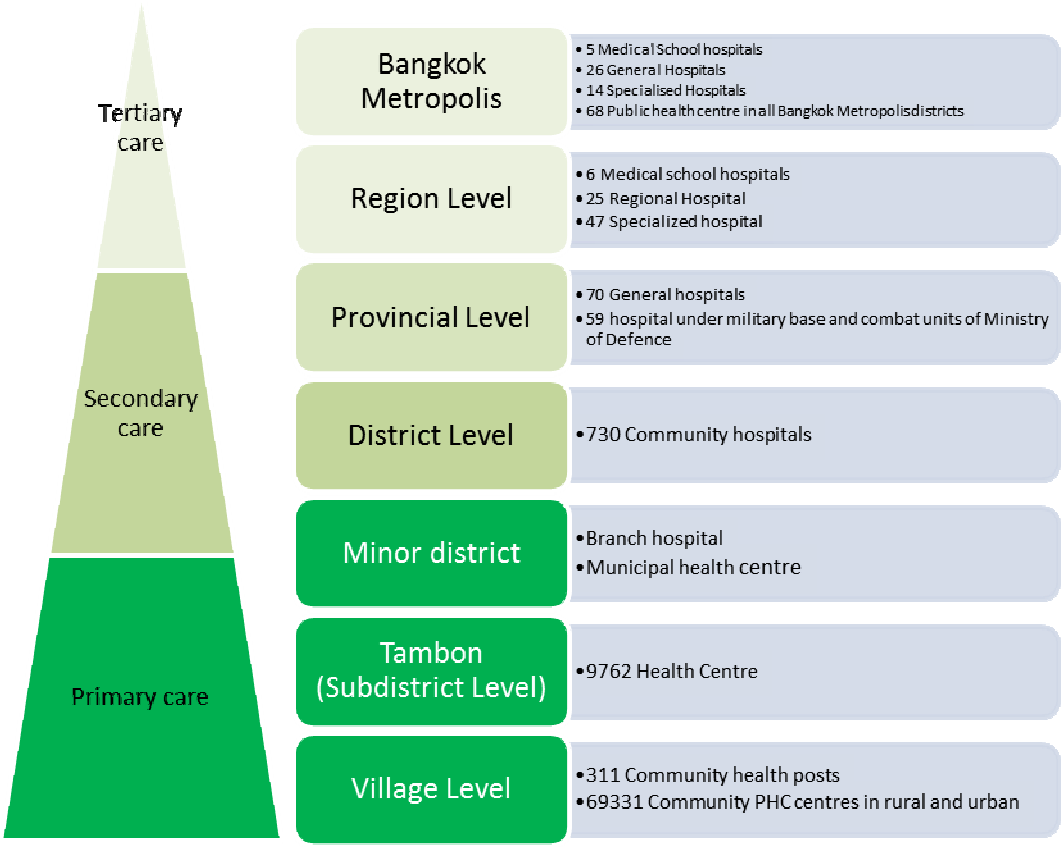
This research focused on the development of a foot care guideline for use in the primary, secondary and tertiary health care sectors involving practitioners who educate and manage diabetic patients. However, discussion about such matters is necessarily linked to a wider policy arena affecting health care professionals and providers of health care services.

2.1 The Health Care Sectors in Thailand

Currently, the health management provision in Thailand (2011) is a three-tier system. People choose their health care service depending on their social-economic status. Most people have health insurance which organises how and where health provision will be provided. The financially rich people have a chance to choose a private hospital while the poorest client groups attend government funded health care centres (Wibulpholprasert 2007).

Due to the different structure of health care provision in Thailand, most people would first access the health care service in their community which is at a primary care level such as Village level/Tumbon level/District level depending on their health insurance (Figure 7.1). Patients attending these centres will be screened for diabetes by nurses and referred for diagnosis to the general doctor in the primary hospital for appropriate treatment. Patients confirmed as having diabetes will receive foot care education and eye screening. If patients have foot complications, they are referred promptly to a secondary or tertiary hospital where further advice on foot education and intervention provided.

Figure 7.1 Health Care Thailand system



Source adapted from Wibulpholprasert (2007) *Thailand Health Profile* 2005-2007. Ministry of Public Health, Thai Health Promotion Foundation; Yhangkratoak and Makarasin, (2007) *Primary Care Unit for Good Health Care System: Guideline for developing community health care (Primary care unit: PCU).* Four Ed. Nakornrajchasrima-Thailand, Training, and developing health care centre

A current analysis of the structure for health care provision for diabetic patients suggests a complex structure. Each hospital provides diabetic foot care and referral systems based on the national diabetic guideline (2007 BCE, in Buddhist 2551 in Thai version) for diabetic patient with diversity of care depending on the level of care, location, hospital size, human resource and equipment (Figure 7.2, 7.3).

Figure 7.2 Relationship between organisational structures with foot care management teams and level of care

Organisation structure	Manpower in Organisation	Provided care for diabetic foot care
• Public Health Branch • Health centre • Community PHC centre	-Nurse/ community nurse/community health care provider	1. Screening pre-diagnosis of diabetes 2. Provide continuing care to patient with risk group 3. Find connection and resource of care 4. Support referral system 5. Find co-operation in community 6. Patient's education in foot care examination, eye screening, followed Hb1Ac
• Community Hospital (10,30,60,90,120, 150 bed)	-Nurse, -General doctor, -Medical doctor*, -Physiotherapist, Specialist foot care* -Nutritionist*	Same 1-6 7. Provide care in patient with ulcer, off-loading* 8. Provide eye screening*, renal failure screening
• General hospital	-Medical doctor or general doctor , - Nurse, -Nurse specialist in wound care*, -Physiotherapist, Specialist foot care* -Nutritionist	Same 1-8 9. Provide care in renal complication
• Regional hospital • Medical hospital	-Nurse, Nurse specialist in wound care, -Endocrine Medical doctor, -Surgery doctor and Vascular Surgery doctor, -Rehabilitation doctor, Specialist foot care* -Physiotherapist, Specialist foot care* -Nutritionist	Same1-9 10. Provide care in complication of vascular surgery

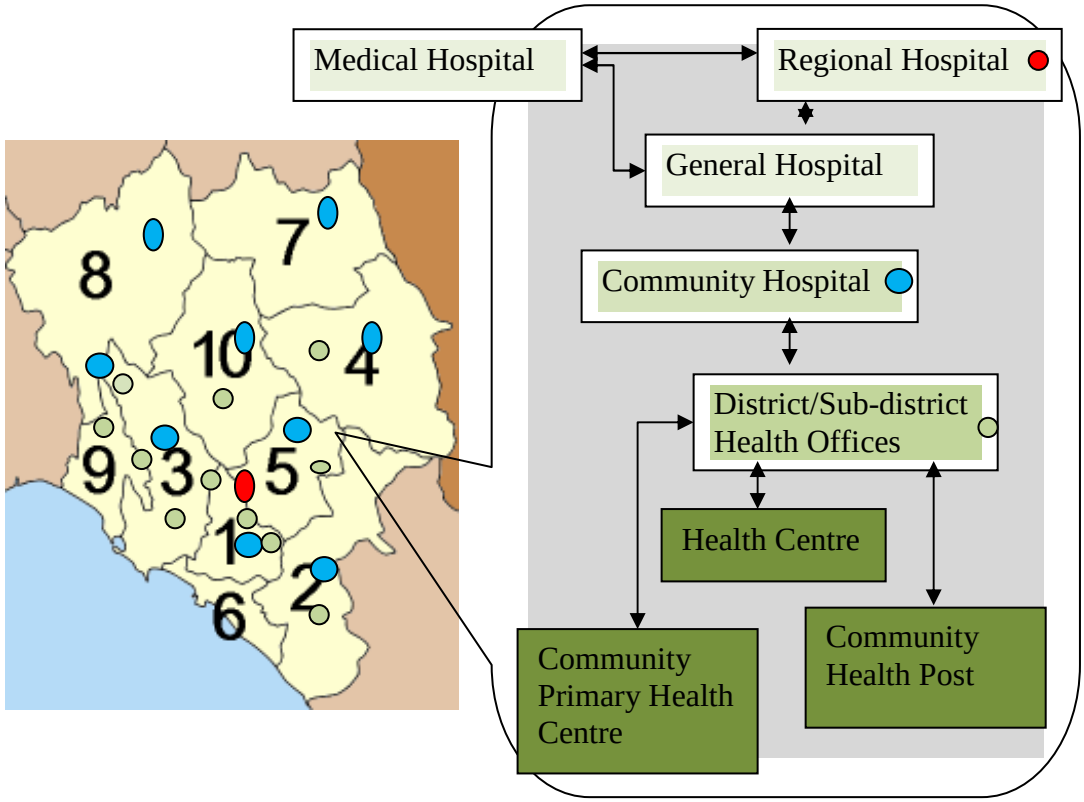
* Not cover every health care service

(Data from: Wibulpholprasert 2007, Yhangkratoak and Makarasin 2007)

This relationship between the different health care providers in Thailand is more complex than commonly recognised. How can usage of the foot care guideline be introduced at all levels in the health care sectors to ensure that diabetic patients are managed in a systematic manner with practice based on current evidence?. Just introducing another foot care guideline into practice is unlikely to provide a sufficient response to the critical and widely recognised problems of inadequate foot care. A more structured approach is needed to enable the implementation of the foot care guideline across the different levels of service providers as shown in Figure 7.2.

Practitioners in smaller centres and hospitals cannot be expected to manage complex cases and therefore a referral system has been incorporated in the foot care guideline to ensure diabetic patients who develop complications receive prompt treatment before their condition deteriorates (Figure 7.3). The main assumption underpinning this strategy is that practitioners aim is to carry out best practice where best implies optimal benefit to diabetic patients within the constraints of the resources and expertise available.

Figure 7.3 Referral system of Thailand



(Data from: Wibulpholprasert 2007, Yhangkratoak and Makarasin, 2007)

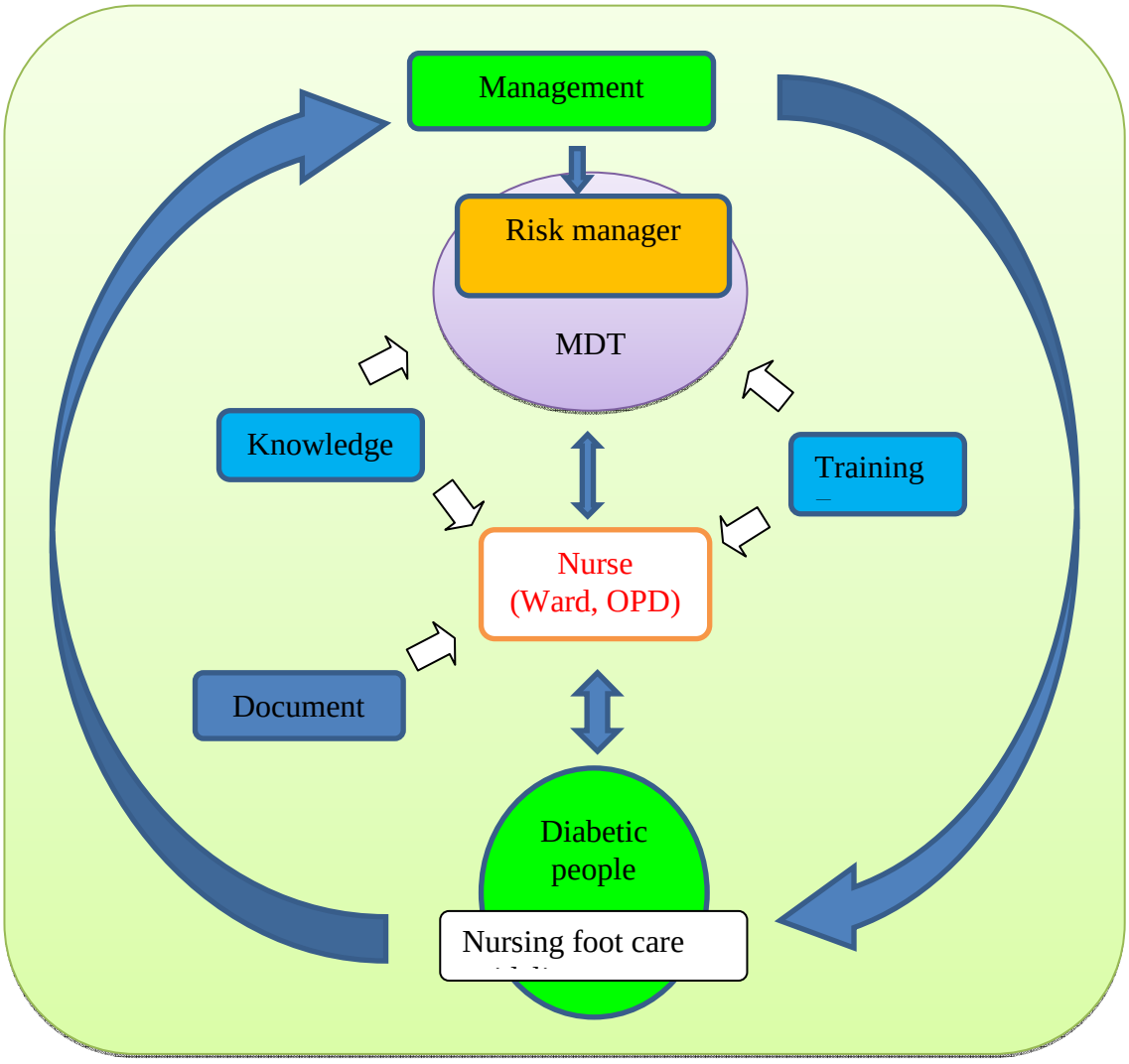
However, best foot care practices cannot be successful unless there is an overall management strategy to implement them. This author proposes to use the Social Judgement Theory (SJT) (discussed in Chapter 3) model as a framework to improve policies in diabetic foot prevention and management in hospital in Thailand.

The aim of SJT is to reduce the risk of diabetic foot complications and to promote decision making, planning and prioritisation of risks in organisation, with effective organisational resource utilisation. The implication of SJT is that risk management would be considered as a priority for management. It is envisaged that a manager should be appointed with the responsibility for coordinating the use of the foot care guideline and be involved in decisions during the implementation of practice guideline. The aim of the risk manager is to organise activities of risk management, combine risk management model with the mission of the organisation, provide financial support and

maintain risk management policies. In additional, the risk manager would initiate strategies for developing staff competence in risk assessment in diabetic foot management, using the risk assessment tool and initiate training.

Marchionni and Ritchie (2008) suggest that the risk manager can be instrumental in changing the behaviour of organisations by maintaining inter-organisational co-operation, positive organisational culture, clinical relations and leadership thus facilitating the implementation of the foot care practice guideline. A collaborative approach to implementing foot care by a MDT across the primary, secondary and tertiary setting should be considered. Edmonds (2008) suggests that the multidisciplinary team (MDT) approach is the key to the successful implementation of clinical practice guideline and must be served as a unique forum to provide treatment of ischemic and infection for diabetic patient with foot problem and the significant reduction of amputation rate. Furthermore, staff should be encouraged and empowered to share their vision and objective of diabetic foot management and risk management strategy.

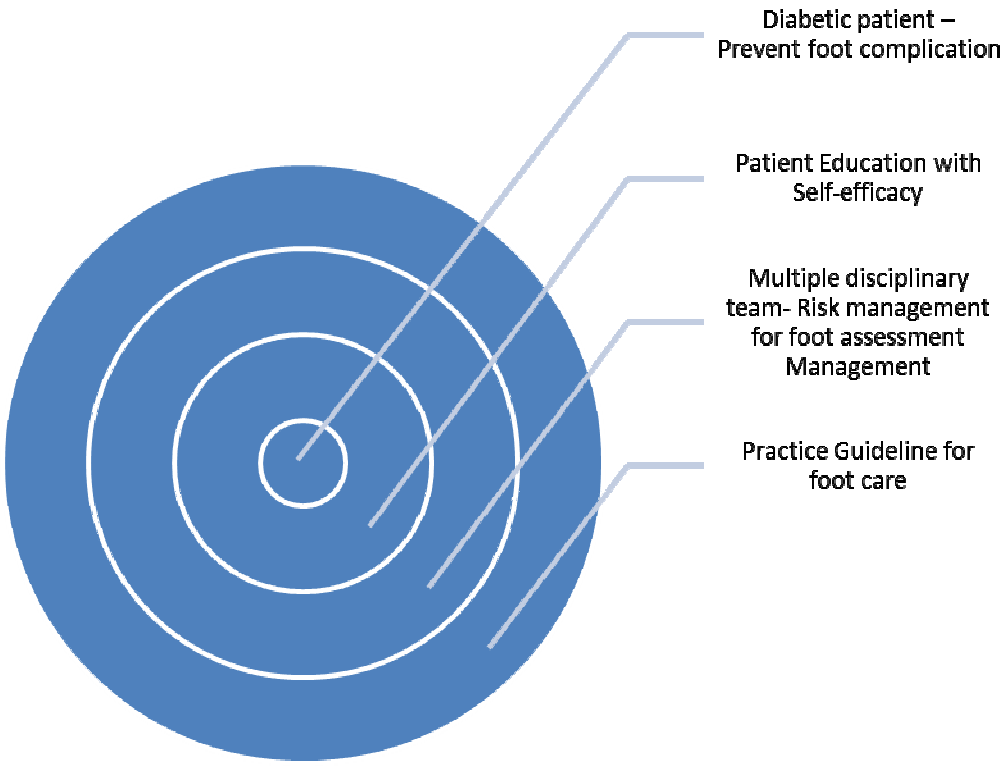
Figure 7.4 Risk management model based on health care in Thailand's hospital.



Risk management strategies should form the cornerstone of diabetic foot care prevention as proper assessment and management will lead to fewer foot problems, greater recovery survival and reduce cost of health care (Ortegon et al. 2004). Hence, the author recommends that the nursing practice guideline for foot care in diabetic patients should be implemented in order to change in practice. Evidence from the UK (Blentley and Foster 2007, Edmonds 2008) shows that early detection of foot problems by the MDT from multidisciplinary clinics increases survival rate and decreases amputation and mobility rate.

In Figure 7.5, the researcher proposes how the guideline could be implemented in the management of diabetic patients. This paper proposes that diabetes care in primary, secondary and tertiary hospital should start with the patient being screened by nurses and doctors. They would then prescribe the appropriate treatment and give advice. Patient's education would be given by doctors, nurses and nutritionists. Foot examination would be undertaken by nurses. In order to implement this guideline, health care providers should ensure that staff should be trained in the use of the guideline.

Figure 7.5 Diagram for nursing practice implementation in hospital



3.Nursing Practice Implication

This study has shown that nursing care given to diabetic patients was not consistent. In order to optimise care for diabetic patients, it is important to implement the foot care guideline. A protocol for diabetic foot care education should be designed and disseminated so that best practices becomes standard care and serve as a guideline in the measurement of quality of care. The foot care guideline provides a framework for practice from primary care to foot care clinic setting. The guideline developed from the MDT provides the integrated practice (Maxwell and Stein 2006) and a useful reference point for enhanced primary care. The guideline promotes decision-making based on the best available data from the evidence base and promotes uniformity of care (Kearney and Friese 2008).

Implementing changes in clinical practice is a very complex process and in which the professional development and involvement of practitioners play an important role. In order to engage fully with practitioners, the researcher proposes adopting a 'bottom-up' approach about the goals that are achievable and in which contexts. Assertions of impracticality may be a routine defence mechanism which nonetheless must be acknowledged and dealt with. The implementation of the foot care guideline would require teaching and at this stage, it is unclear what outcomes to expect. The clinical forms for diabetic foot assessment and management should be put in clinical areas where diabetic patients are cared for. An information booklet should have been developed to aid in the training of health care professionals.

As mentioned above, implementation of the guideline will improve practical care, reduce cost, provide effective solution and improve diabetes management. Nursing implication should also be concerned with using available resource in diabetic foot management. Nurse needs to know what resources are available to prevent diabetic foot complication and use them effectively in their clinical areas.

Nurses should review and revise handout and guideline for foot assessment in hospitals. This guideline should clarify where the patients should be referred to, classify risk

categories and apply what criteria to refer patients as this guideline has been designed based on research evidence and expert opinion.

Nurses need to know how to reduce the risk of foot ulcer, foot amputation and recurrence of foot ulcer and have the resources in place. Hence, the manager of the team should ensure that adequate resources are available in clinical practice including strategic and financial plans. It is necessary to support the purchase of equipment /resource and promote self-care in patients. Many patients with diabetes in Thailand have no appropriate footwear because of financial problems, culture and lack of knowledge. Nurse should know how to find the budget to provide appropriate footwear in poor groups as this is a major social problem and as discussed in Chapter 5, leads to patients wearing inappropriate shoes and increasing the risk of complications.

3.1 How nursing practice guideline could be developed in Thailand

Several clinical practice guidelines have been developed for use in health care settings in Thailand but the implementation is still in its infancy. The current guidelines may be in danger of falling into the same situation as other guidelines. Therefore, they need to be well promoted in clinical practice.

The first method to promote the use of the new guideline in clinical practice is to integrate them into an educational course, mainly in order to increase student nurses' competency, particularly in diabetic foot care. As an educator, the researcher will design a training course using the new guideline as an intervention, aimed at increasing the competence related to foot care management of pre-registered nurses. Pre-registration nurses from multiple nursing schools under the division of the Ministry of Public Health, Thailand should be competently trained in the requisite skills of diabetic foot care. After their training, these students can evaluate the training programme to find its advantages and disadvantages. It is suggested in future that a focus group will be used to gather information from these students to find whether this guideline is appropriate and easy to use in their clinical practice in their educational journey. Moreover, using a group and sharing work amongst group members will reduce potential for bias in the evaluation process as well as improved awareness of guideline, as proposed by

Gramham and Harrison (2005). When the educators who prepare nurses are unable to be show competency both in theory and in clinical practice, then health care professionals with foot care expertise should be encouraged to become involved in teaching roles, in order to share their knowledge and experience in foot care based on their clinical practice.

The second method is to promote a best practice model using the new nursing guideline in foot care in clinical health care settings. This model was proposed by Davis and Taylor-Vaisey (1997) who identified hospital settings, in which clinicians could try new ideas, such as innovative foot care guidelines, which would provide an optimal environment. These guidelines have to be practiced in a randomised trail control study, as proposed by Grimshaw et al. (1995), since such an approach yields the best evidence of the effectiveness of implementation and the main outcomes which could be measured. Some Thai nurses have sufficient knowledge of diabetes and its complications and are confident in conducting foot examinations, as well as having sufficient knowledge to educate patients on their conditions and the prevention of complications as addressed in the results of this study. However, in Thailand, nurses need advanced practice and experience in the use of the best practice. Nurses should be encouraged to apply the new guideline in their clinical practices and to develop a critical understanding of their practice, so as to prepare to change their practice supported by evidence-based findings for foot care. As addressed in the results of the study, the current practice system in Thailand does not require staff to demonstrate knowledge or competency beyond their initial qualification stage. Hence, nurses should be encouraged to be familiar with not only applying simple nursing procedures but should also use the new nursing practice guideline as a source of information about foot care in order to promote desirable patient health outcomes.

Even when Thai nurses are knowledgeable and competent in caring for patients with foot problems, unfortunately some patients fail to follow their recommendations. The research findings showed that patients often accepted diabetes to be a chronic illness but did not necessarily change their health care behaviour because they had only very limited, and in some cases, inaccurate information. Therefore, patient-based interventions using the new guideline should be applied to support patients' discussions

about the appropriate care for their specific health problems. After applying the current guidelines the focus group or questionnaire would be used to evaluate whether the current guidelines constitute a weak, effective, or strong intervention in the clinical health care settings.

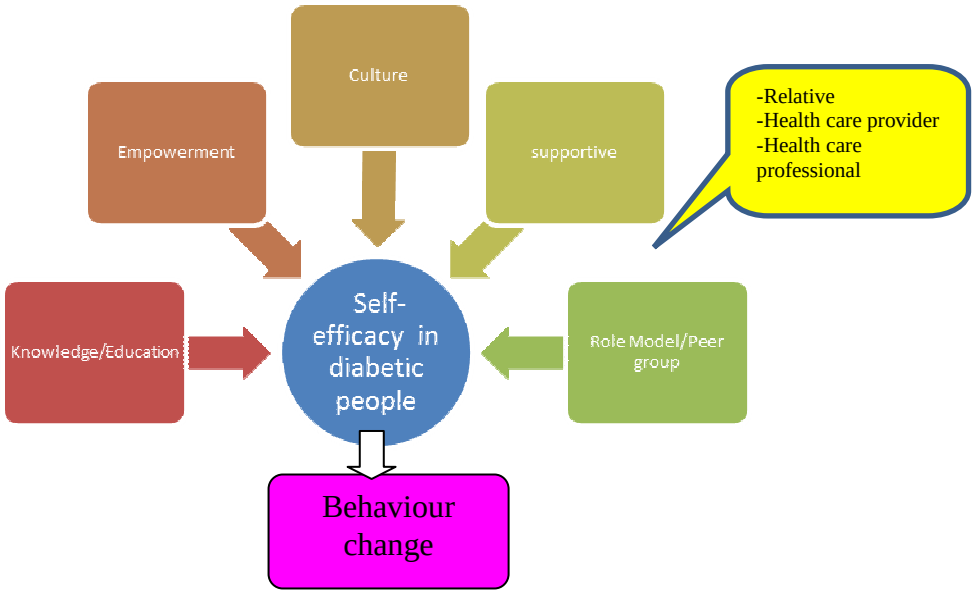
Finally, an implementation manual would be provided to address the issue of continuous education strategies. It is recommended by Davis and Taylor-Vaisey 1997) that the effectiveness of a nursing practice guideline is correlated to the strategy and the effectiveness of the implementation process. The implementation process for these guidelines will be contained in a tool kit, in order to assist any organisation wishing to make use of the nursing practice guidelines.

3.2 Patient empowerment using the self-efficacy model

The findings in this study indicate that patients had some education about their disease and foot care. However, further analysis of the data showed that patients were not participants in the decision making about their care. They were told what to do by doctors and nurses without involving the patients in their care and this resulted in some degree of concordance among the patients.

Quarles (2005) has reported that the use of the self-efficacy models in diabetes education promotes foot care. Gist and Mitchell (1992) have shown that giving information, persuasion and reward can be used for changing behaviour. The researcher therefore proposes using the self-efficacy model as shown in Figure 7.6 to change the approach to the management of diabetic patients as self-efficacy can predict self-management (Krichbaum et al. 2003, Clark and Dodge 1999). When people believe in their knowledge and skills, they will devote the ability to succeed. Patients should be empowered to become independent and confident so as to achieve self-care activity. Consequently, nurses should be concerned with self-efficacy concept in patients' education especially foot care behaviour, so patients can develop confidence and belief in their ability (Hurley and Shea 1992,William & Bond 2002, Chuepan 2010). This approach to education promotes efficiency belief as well as applying an individual's own experience.

Figure 7.6 Self-efficacy frameworks for changing behaviour in diabetic people



In this model, education is important, as the knowledge gained by the patients will empower them to make decisions that will affect their behaviours regarding their diabetes and foot care. The system will also work best in a supportive environment where the patient feels that the health care professionals and the family members are there to help them. The peer group support and the good role models as developed in DESMOND framework will encourage patients to witness the benefits of behaviour modifications and may encourage them to review their own behaviours and plan a self-management programme. This model also takes into account the powerful influence of culture in Thai society such as the non-wearing of shoes inside the house or diets and professionals will have to be mindful of this and be flexible.

4. Nursing Education Implication

Although the research aim was to develop a foot care guideline for use in Thailand, the analysis of the interview data requires the consideration of the education of the health care practitioners involved in caring for diabetic patients so that effective care is given to patients. This can be achieved in several ways and these are discussed in the subsequent sections.

4.1 Continuing professional education

Professional bodies regard qualified staff as competent almost by definition but the knowledge base for diabetes management has evolved and grown significantly in the last decades. The notion of professional education as part of one's professional responsibility is no longer sufficient to plug the competency gaps in this study. Continuing professional education should be considered as an essential pre–requisite in developing the knowledge and skills base of practitioners. One of the recommendations of the project is that qualified staff managing diabetic patients should be competent to undertake that role. Health care professionals must have an adequate knowledge for their roles and these can be achieved by staff undertaking continuing professional development (CPD) programmes (Aalaa et al. 2012). A clinical audit of post qualifying learning for staff involved in diabetes care should be carried out and this could form the basis for CPD rather than an ad hoc approach to CPD based on simple specifications of content CPD programmes can be delivered via more formalised courses in Higher Educational settings or via 'work based learning models'. However, it is not possible to discuss all these alternative models of formal and informal learning in this research. Further research is required in order to address some of these issues.

5. Conclusion

The main achievement of the project was the development of the foot care guideline. However, it became clear that implementing the tool for improving the quality of patient care would require several critical changes. The policy implications are vast and this paper proposes using the SJT risk model to support the development of a risk strategy with foot care management becoming part of the management responsibilities. A risk manager could be influential in coordinating all the activities resulting in the implementation of the foot care guideline across the complex health care structure in Thailand. The foot care guideline is a practice tool and its successful implementation in clinical practice relies heavily on creating an environment in practice where staff members are willing to use the form to assess the patients. Staff should be supported to develop their knowledge via appropriate CPD learning programmes.

Chapter Eight: Limitations, Recommendations and Conclusions

1. Summary of Findings

The main purpose of this research study was to develop a specific culturally sensitive foot care guideline for the assessment and management of diabetic patients and to reduce the risk of developing complications, which is expensive to manage and brings a lot of misery to patients. NICE (2004) and IWGDF (2007) have recommended the use of a foot care guideline in the management of diabetic patients, thus providing a systematic approach to the management of diabetic patients and ensuring high quality of care is delivered. The guideline developed by NICE (2004) and IWGDF (2007) was based on information from developed countries in the western world, and currently no studies have been undertaken to develop a similar model of foot care in the developing countries such as Thailand, where the prevalence of diabetes is increasing. Therefore, an exploration of current clinical practices of foot care using semi structured interviews and a Delphi technique was used in this research as methods of data collection and for developing a foot care guideline.

In accordance with this rationale, the research aims for this study were:

- To explore the current and best foot care practices in diabetic patients in Thailand
- To identify core components of foot care for diabetic patients in Thailand
- To develop the national nursing practice guideline for foot care in diabetic patients

One of the principal achievements of this research has been the conceptual and methodological development of a culturally sensitive foot care guideline for use with diabetic patients in clinical practice within Thailand. This chapter provides the usefulness of the findings in term of limitations, recommendations for the future

research and conclusions particularly to enable nurse practitioners managers, nurse educators and researchers to broaden their knowledge and understanding in diabetic foot management including changing their practice toward optimum diabetic foot ulcer assessment and prevention.

The present study explored the current practice for foot care of diabetic patients in Thailand and these findings resulted in the development of a new foot care nursing practice guideline for diabetic patients. This study is the first nursing practice guideline for foot care in diabetic patients developed using a panel consensus and the Delphi technique. Although there were a few studies (Suphimaros 2006, Jaruchainiwat 2003) and attempts have been made at developing a nursing practice guideline (2007 in Buddhist 2551 in Thai version) all of them used only practical experience to build up their guideline with the contributions from a few experts only. Additionally, the objective of the guideline was to recommend foot ulcer care with all patients in the local setting and there was no previous inclusion of risk management strategies.

2. Study Limitation

This study had adopted an exploratory methodology for exploratory current foot care practices and a consensus approach to the development of the foot care guideline. These were based on the conceptual work of Soukup (2000) and justified the approach for this type of study. However, as in all studies, with hind sight it is possible to identify limitations which require attention and are discussed in the following sections.

2.1 Interview design

1) This study used a semi structured interview and Delphi technique. The number of patients, educators and nurses interviewed was small and although it provided an insight into the current practice of foot care, it was limited to one district hospital. A larger sample including several hospitals in the district would have given a better understanding of the clinical practices in the management of diabetic patients especially in the community health centres and the more advanced tertiary hospitals. This would

increase the generalizability of the findings and make the implementation of the tool nationally much easier.

2. A purposive sampling design was used to select the study sample from a hospital population. Although there is good rationale for selecting the sample for this study, the findings should be considered with due care. The sample was also selected from a hospital population and may not be representative of what education diabetic patients may be receiving on the initial diagnosis of diabetes. The inclusion criteria for the study were those patients who had diabetes and those nurses and educators who were involved in the management of these patients. This process may have excluded several patients who could have provided valuable information.

The data collection process included semi structured interviews which also involved discussing pseudo cases. This may have limited the practitioners ability to discuss their interventions as practitioners are able to do but unable to explain what and how they do what they do (Eraut et al. 1995) thus skewing the data and suggesting their inability to manage their patients effectively. A field study with real patients would have provided a greater insight into how practitioners were managing diabetic patients.

2.2 Delphi technique design

1. The guideline that has been developed has so far not been tested in clinical practice in Thailand. Although similar tools have been extensively studied (NICE 2004) the validity and reliability for this tool is yet to be determined and will require further research.

2. The researcher could not have undertaken any additional data collection due to the pressure of time and limited resources.

3. Identifying the panel and selecting professionals who are acknowledged as experts in this area is a challenge. In this Delphi technique, the researcher relied on publishers' suggestions, searching websites of hospitals, the ministry of Public Health, university and the diabetic association in Thailand, the best practice of diabetic clinic of public

health, and researchers involved diabetic foot and thus may have unintentionally excluded some experts.

3. Recommendations

Following the development of the foot care guidelines, as reported in this study, the researcher proposes the following recommendations for the implementation and use of the guideline in Thailand.

3.1 Clinical practice

This research is recommending the use of the foot care guideline in order to reduce the risk of complications associated with diabetes. All patients diagnosed with diabetes should have access to a health care professional who can competently carry out a risk assessment and following the findings, recommend appropriate interventions including patient's education. At present, there is no systematic assessment and management of risk and patients care at best depends on the expertise available from individual health care professionals. Those patients who are not at risk should have an annual review including assessment of neuropathy and peripheral vascular disease. However, those patients who are at risk, as defined in the foot care guideline, should have the recommended interventions. More attention should be given to those patients who are at very high risk of developing foot problems, as the complications could ultimately result in an amputation of the limb.

Regarding the health care providers who adopt the guidelines, nurses in diabetic foot clinics should be expected to use the new nursing practice guidelines for foot care and follow the guidelines of this organisation of hospital. The foot care assessment forms should be integrated in the current admission documentation (Figure 6.3), thus providing practitioners with the relevant forms and a seamless structured and holistic approach to the assessment and management of the patient. This will result in nurses in different settings being accountable for using the foot assessment form to overcome the problem of the under-reporting of diabetic foot complications. This will help the nurses to assess and record accurate and high quality data. This information can then be transformed from the foot care assessment form into knowledge and information that

can be used at different organisational levels. Furthermore, in practice the nurse should be able to produce reports that provide risk classifications. This, in turn, will improve the referral system, which should decrease the incidence of foot ulcers or amputation, and also reduce the recurrence of foot ulcer and therefore the readmission of diabetic patients.

3.2 Staff development

The second recommendation of this research is that health care professionals involved in the management of diabetic patients should have the knowledge, skills, competence and confidence to take those roles. The evidence as presented in Chapter 6 indicates that some staff did not have up-to-date knowledge of the management of diabetic patients and therefore were unable to give best advice regarding foot care management. It is imperative that clinical staff should therefore be supported to develop their knowledge and skills. Thus urgent action is required by and for hospital and educational institutions in Thailand in order to provide opportunities for staff development by offering relevant courses that meet their education needs. It can be argued that repeated use of the guideline tool will increase practitioner's confidence and over time will allow them to progress from being novices to experts in the field of diabetic foot treatment (Benner 1984, Gatley 1992). However, it must be recognised that this transitional phase can be unsettling and staff will require a great deal of support and encouragement.

The foot care guideline is a complex tool which practitioners are not yet familiar. It depicts areas of knowledge and practice that practitioners may lack and will need support to develop. Teaching practitioners how to use the foot care guideline in clinical practice may present the greatest challenge. How much time and support will be required for staff to develop the knowledge and skills to carry out foot care assessment, together with the issue of patients' education competency, has not been explored in this study. However, it is fair to recommend that an organised scheme should be set up to provide support and create a learning environment which does not threaten the 'comfort zones' of practitioners. Communities of practice (Wenger and Snyder 2000) could be set up to encourage sharing of practices and for mutual support.

In hospital and other medical departments involved in diabetic foot care, using the practice guidelines will benefit nurses who, as a result, should be able to improve their knowledge regarding foot assessment, as well as disease and complication prevention, because this research has revealed that many problems are caused by lack of knowledge of diabetic foot management. Improvements could come through providing continuing education and training programmes for all relevant healthcare personnel. Using the guidelines will help the nurses know how to examine a patient's foot and provide foot care education, including referral of foot complications and compliance with the organisation's criteria for undertaking this activity. That would also help nurses to continuously monitor that the use of foot care guidelines followed hospital policies. Moreover, the nurses in clinical settings should be aware of the resources available for foot assessment, referral and wound care in order to prevent foot ulcers and foot amputation. In particular, all nursing staff in different settings relevant to diabetic foot care should engage in foot assessment and foot care management. Improving general nurses' skills of foot care management and in their education role are important aspects of the diabetes specialist.

The research also showed that educators' knowledge and practice skills were insufficient for the effective management of diabetic patients. How educators teach students, both in clinical practice and in schools of nursing should be reviewed, with particular reference to the role of educators in practice. They should also ensure that they are supported to develop the necessary skills and clinical competence. It is recommended that educators should also be encouraged to meet up with diabetic specialist practitioners to discuss developments in that field.

Research has shown that opportunities for learning in clinical practice is limited (Eraut et al. 1995) and that learning in the workplace is peripheral to the delivery of care. One can argue that if clinical areas are conceived as a learning community (Wenger 1998) then all practitioners should be able to benefit from such an approach to learning and sharing of experiences in order to improve practice. However, further research (within the context of Thailand) will be required to identify how learning can be encouraged in an environment where care delivery is considered to be paramount.

3.3 Policy changes

The following policy changes are required in order to manage the change. There should be a clear strategy to oversee the introduction of the tool and the education of staff in the use of the tool. Patients should be seen by professionals who have the expertise to manage diabetic patients. A referral system as outlined in Chapter 7 should also be introduced to ensure patients are referred for the right treatment. Foot care prevention leaflets must also be produced and given to patients to emphasise the risks of diabetes and to reinforce good foot care practices.

A strategic approach as discussed in Chapter 7 should be taken to the management of diabetic patients so that care becomes holistic and seamless. The appointment of a dedicated person to coordinate all the activities and ensuring good support to staff will be an essential requirement for a successful implementation of the guidelines.

4. Further research

The study of diabetic foot ulcers is complex (IWGDF 2007) due to the multifactorial nature of the pathology of the disease and the factors, which contribute to the development of foot complications that, in extreme cases, resulting in amputations. Additionally, it is extremely important to understand the social pressure of communities which contribute to the development of foot ulcer, if limb amputations are to be reduced or prevented. Thus, more research is necessary in this area including the impact on patient outcomes. Through cumulative research, findings can be generalised in order to improve clinical management of patients having diabetes.

The development of the guideline has been based on a consensus report from a panel of experts in Thailand. The involvement of the panel of experts from Thailand should ensure that the foot care guideline has been based on expert opinion of health care practitioners who are familiar with the current socio-political climate and resource implications at a local level. As discussed in Chapter 7, Thailand has a complex health care system and implementing such a tool may require greater collaboration between the different health care providers involved in the treatment of diabetic patients. However,

the following areas of research are recommended which will add to the evidence base which will ultimately result in batter patient care.

1 The short and long term effects of the implementation of the foot care guideline.

The implementation of the foot care guidelines needs to be evaluated to ensure that it is achieving its purpose. A clear audit system should be put in place to ensure that data is gathered appropriately and incidence and prevalence data are monitored to gauge the impact. Since diabetic complications develop over a long period of time, the impact may not be evident in the short term. For example, longitudinal research could be conducted in the same settings using nursing practice guidelines for foot care and foot examination records, or in a setting using the national guidelines. Alternatively, a quasi-experimental designs, or randomised control group design could be applied between two groups of diabetic patients in hospital, in order to study the effectiveness of the new practice guidelines on cost of treatment, quality of the patient's life, and self-foot care management. For long term effects, a retrospective study should be applied for studying the impact of the nursing practice foot care guideline for diabetic patients on incidence of foot ulcer and amputation, and the onset of developing foot complication. In addition, the barriers which face the implementation of the nursing practice guidelines of foot care within MDT could be explored by using qualitative research designs.

2. What changes are needed to make the guideline useable?

The purpose of the tool is to assess those patients at different levels of risk of developing foot complication and providing the right interventions. It is important that the tool achieve this objective. Thus once the tool has been implemented, an evaluation of its effectiveness, plus revision, in hospital especially within the context of foot care clinics and any department, relevant to or involved with diabetic foot care will be needed. As an example, an investigation into the effectiveness of foot risk classification on the incidence of foot ulcer and foot amputation should be conducted, including measures of sensitivity and specificity. This will allow the incorporation of further research into the design of the foot care guidelines as new knowledge and practices emerge.

In addition, resources may become scarcer and in some cases the opinions of health care practitioners may differ. Specifically, further literature reviews should be planned and developed as nursing practice develops.

3. The course of diabetic foot care training is suitable for health care providers

It is strongly recommended that research into the implementation and effectiveness of training on diabetic foot care should be conducted to evaluate the benefits it provides. This study design should be qualitative because this research would explore more in-depth information relevant to the advantages of and barriers to training. Moreover, the quality of foot care should be assessed in the diabetic patient group via exploration of foot care behaviour, incidence of foot ulcers and foot amputation.

5.Summary

This research study has shown that foot care guidelines for diabetic patients can be constructed in developing countries in order to prevent foot care complications which can arise as a result of diabetic patients' poor education, the lack of self-management and the role of health care practitioners in preparing patients to manage their condition.

The implementation of the foot care guideline into practice remains a challenge for the researcher and further work will be required, such as gaining authoritative support, as discussed in Chapter 7, from the health care providers involved.

To facilitate the use of the foot care guidelines in clinical practice, health care practitioners will have to be adequately prepared and supported in their endeavour. Further changes may also be required to unsure that learning opportunities are available and provided by relevant educational institutions.

The effective use of this guideline in clinical practice should reduce the risk of complications in diabetic patients and arguably lead to an improved quality of care.

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Appendices

Appendix 1 Literature review

Appendix 1.1 Searching the relevant literature review in diabetic foot word

Topic	Between year	Number	Limit nurs*	Fulltext, Ref avaliable
Diabetic foot	1953-2012	5027	482(1952-2012)	101 (1995-2012)
Diabetes foot	1962-2012	789	122 (1984 -2012)	26 (1996-2012)
Foot in diabetic	1983-2012	1245	82 (1992-2012)	17 (1996-2012)
Foot in diabetes	1962-2012	485	65 (1984-2012)	13 (2001-2012)
Foot care in diabetic	1988-2012	136	15 (1997-2011)	4 (2004-2011)
Foot care in diabetes	1962-2012	104	25 (1984-2012)	7 (1997-2012)

Search data 3 Oct 2012

Topic	CINAHL Full text	Repeat	Time
Clinical practice guideline & foot care	9	-	1997-2011
Clinical practice guideline & diabetic foot	4	-	1997-2011
Clinical practice guideline & diabetic foot	1	1	2011
Clinical practice guideline & diabetic foot	-	5	2000-2008

Literature for diabetic foot care

Name of article	Patient			Patient education	Risk factor for predicting diabetic foot	Nurse	Prevention Programme	Guideline
	Knowledge of diabetic foot	Practice for foot care/ Behaviour	Psycho social			Knowledge of diabetic foot		
Alka and Cina 2008			√		√			
Anichini et al 2007								√
Bell et al 2005	√	√			√			
Bowman 2008							√	
Calle-Pascual 2002							√	
Coelho et al. 2009			√					
Corbett 2003							√	
De Beradis et al. 2005		√				√		
Desalu et al. 2011	√	√						
Flood 2009						√		
Fujiwara et al. 2011							√	
Gale et al. 2008	√	√						
Hasnain and Sheikh 2009	√	√						
Iversen et al. 2008		√			√			
Rerkasem et al 2004					√			
Rerkasem et al 2007							√	
Rerkasem et al 2008							√	
Khamseh et al 2007	√	√						
Marthinez et al. 2005						√		
Mcinnss et al. 2011				√				
Naicker et al. 2009	√	√			√			
Ogbera et al 2008		√			√			
Olson et al. 2009	√	√						
Perrin and Swerrisse 2008					√			
Perrin et al. 2009		√	√					
Pollock et al. 2004	√	√						
Quarles 2005							√	
Richie and Prentice 2011								√
Smide 2008		√						
Schmidt et al. 2008		√						
Sharifirad et al. 2007	√	√						
Smide 2008		√						
Slot et al. 2011				√				
Tantisiriwat and Janchai 2008					√			
Wright et al. 2004								√

Appendix 1.2 Methodology checklist: qualitative studies

The criteria used in this checklist are adapted from

- Letts, et al. (2007) Guidelines for Critical Review Form: Qualitative Studies (Version 2.0). The Criteria Review Form: Qualitative Studies originally developed by McMaster University. Occupational Therapy Evidence-Based Practice Research Group by Letts et al., 2007 Available from: www.srs-mcmaster.ca.Portals_20_pdf_ebp_qualguidelines_version2.0.pdf [Accessed 12/10/ 2011].
- Bromley, et al.. (2003) Criteria for evaluating qualitative studies. The Qualitative Research and Health working group, Liverpool school of Tropical Medicine. Available from: www.liv.ac.uk/stm/download/guidelines.pdf [Accessed 12/10/ 2011].

Study Identification *Include full title, all author, reference (full journal title, year, volume number, page number) year of publication*				
Criteria:		**How well is this criteria addressed?** **(Circle one option for each question)**		**Hint**
1.Aim of study				
1.1	Are the aims and objectives of research clearly stated?	Clearly described Unclear Not reports	Comment	-What is the goal of the research? -Why it is important? -What is its relevance to the wider body of research and the specific field?
1.2	Is a qualitative methodology appropriate for this study?	Appropriate Unclear Not Appropriate	Comment	-Does the research methodology seek to understand or illuminate the subjective experiences or views of research participant? -Does the research methodology seek to understand what is happening and the reasons why observed situations or outcomes occur?
2.Literature Review				
2.1	Are relevant background literature reviewed?	Relevant Unclear Not Relevant	Comment	
3.Study design				
3.1	Is (are) the research question(s) clearly defined and focused?	Clearly defined and focused Unclear Not focused Not Defined	Comment	-Is (are) the research questions relevant to the aim of study? -Is (are) the question(s) structured in a way that seeks to answer all the objectives of the study?
3.2	What is the study design?			
3.3	Is the study design appropriate for the research question and objectives?	Appropriate Unclear Inappropriate	Comment	-Is a range of methods used for triangulation, or is use of a single method justified? -Has the researcher justified the research design (for example, have they discussed how they decided

				which the method use)
3.4	Is a theoretical perspective identified?	Identified Unclear Not identified	Comment	
4. Qualitative Method				
4.1	Does the study describe the methods used to generate data?	Described Unclear Not described	Comment	What kind of the method is used? -participant observation -interview -focus group -historical research -other qualitative method
4.2	Is the method appropriate for the study design type?	Appropriate Unclear Inappropriate	Comment	
5.Sampling				
5.1	Are participants relevant to the research question and is their selection well-reasoned?	Relevant Not relevant Not reported	Comment	
5.2	Is the recruitment or sampling strategy appropriate to the aims of research question?	Adequate Not adequate Not reported	Comment	-Has the researcher explained how the participants were selected? -Are the reasons for this choice discussed/compared to other strategies? -Is it clear why some participants was not selected, or declined to take part? -Are there details about who was select and why (consider gender, age, ethnicity, marital status)? -Was the sample sufficient to understand the study context and population?
5.3	Is sampling done until saturation or redundancy in data is reached?	Reached Not reached Not reported	Comment	
5.4	Was informed consent obtained and is it clear why some individuals chose not to participate?	Informed Not informed Not report	Comment	
6 Data collection				
6.1	Are methods of data collection adequate to answer the research question?	Adequate Not adequate Not reported	Comment	-Is it clear how the data was collected (Topic, guide checklists, focus groups, semi-structure interviews)? -Has the research justified the methods chosen? -Are the details provided about the method used (for example for interview method.is there and indication of how interviews were conducted, did they use a topic guide)? -If methods were modified during

				the study, has the researcher explained how, and why? -Were data collection tool pilot tested?
6.2	Is there a clear and complete description of the site, participants and research credentials?	Clear Unclear Not reported	Comment	
6.3	Is the role of the researchers and his/her relationship with participants and identification of the researchers assumptions clearly described?	Described Not described Not reported	Comment	-Who conducted the research, how were they selected? -Are the research skills motives, background, position in term of power –relations (gender, age, ethnicity, employment relation) and perspective described and discussed? -Have the researchers critically examined their own role, potential bias and influence during the formulation of the research questions, data collection and sample recruitment?
6.4	Have ethical issues been addressed adequately?	Adequate Unclear Not adequate	Comment	-Are there sufficient details of how the research was explained to the participants? -Are there details of what consent procedures were used? And how consent was obtained? -Is it clear how confidentiality and privacy were assured in the study? -Was approval sought from the ethics committee?
7.Procedural rigor				
7.1	Are the data collection strategies comprehensive enough to support rich and robust descriptions of the observed events?	Adequate Not adequate Not reported	Comment	
7.2	Are the data collection methods appropriate for the research objectives and setting?	Appropriated Not Appropriate Not reported	Comment	
8 Data Analysis				
8.1	Are the data analysis inductive and the findings adequately corroborated?	Adequate Not adequate Not reported	Comment	
8.2	Are findings consistent with and reflective of data?	Consistent Not consistent Not reported	Comment	

8.3	Is a decision trail developed and rules of analysis reported?	Develop Not develop Not reported	Comment	
8.4	Is the process of transforming data into themes/code described adequately?	Adequate Not adequate Not reported	Comment	
8.5	Is the data analysis sufficiency rigorous?	Rigorous Not rigorous	Comment	-Is it clears how the researcher processed the raw data to arrive at the stated result? -Were the categories and themes identified in advance, or derived from the data? -Are all data taken into account in the analysis? -Are responses/experiences compared and contrasted across different groups/individuals/study sites? -Have the researchers critically examined their own role, potential bias and influence during analysis and selection of data for presentation?
9. Finding/interpretation				
9.1	Are the findings internally coherent, credible (valid)?	Valid Unclear Potential bias	Comment	-Are the findings drawn from analysis of collected data rather than from the researcher's preconceptions? -Is there and adequate discussion of the findings both for and against the researchers' arguments? -Has the research critically reflected on the quality of the data collected and skilled of the research team?
9.2	Are the findings relevant?	Relevant Unclear Limited relevance	Comment	-Are the findings relevant to the study aims/objectives/questions? -Is there a discussion about how the research contributes new knowledge or understanding in the field?
10. Implications of research				
10.1	Are the implications of the study clearly reported?	Clearly reported Unclear	Comment	-Are the findings placed in the local context (geographical, cultural, political, and socioeconomic)? -Are the findings discussed in wider context (in relation to other studies on the same topic)? -Have finding been disseminated to key stakeholders including participants?
10.2	Is there adequate discussion of study limitations?	Adequate Inadequate Not reported	Comment	-Are the weaknesses of the study design discussed? -Is there a discussion of new areas where research is needed?

Methodology checklist: Quantitative studies

The criteria used in this checklist are adapted from

- Coughland et al. (2007) Step-by-step guide to critiquing research. Part 1: quantitative research. *British Journal of Nursing*, 16(11), 658-663.
- Cynthia (2005) Evaluating quantitative research reports *Nephrology Nursing Journal*, Jan-Feb. Available from: http://findarticles.com/p/articles/mi_m0ICF/is_1_32/ai_n17208725/?tag=content;col1 [Accessed 24/10/2011].

Study Identification *Include full title, all author, reference (full journal title, year, volume number, page number) year of publication*				
Criteria:		**How well is this criteria addressed?** **(Circle one option for each question)**		
1.Background /purpose of study/Research problem				
1.1	Is (are) the research question(s) clearly defined and focused? (1,2)	Clearly defined and focused Unclear Not focused Not Defined	Comment	
2.Aim of study/objective/research question/hypothesis				
1.1	Are the aims and objectives of research clearly stated?1, 2	Clearly described Unclear Not reports	Comment	
3.Literature Review				
3.1	Are relevant background literature reviewed? 2	Relevant Unclear Not Relevant	Comment	
3.4	Is a theoretical perspective identified? 1,2	Identified Unclear Not identified	Comment	
4. Methodology /Instrument Design				
4.1	What is the study design?			
4.2	Is the study design appropriate for the research question and objectives?	Appropriate Unclear Inappropriate	Comment	
4.3	Is the research design clearly identified?	Clearly Unclear No reported		
4.4	Is the instrument appropriate?	Appropriate Unclear Inappropriate	Comment	
5.Sample				
5.1	Are participants relevant to the research question and is their selection well-reasoned?	Relevant Not relevant Not reported		

5.2	Is the recruitment or sampling strategy appropriate to the aims of research question?	Adequate Not adequate Not reported	Comment	
5.3	Was informed consent obtained and is it clear why some individuals chose not to participate?	Informed Not informed Not report		
6 Data collection				
6.1	Are methods of data collection adequate to answer the research question?	Adequate Not adequate Not reported	Comment	
6.2	Is there a clear and complete description of the site, participants and research credentials?	Clear Unclear Not reported	Comment	
6.3	Is the role of the researchers and his/her relationship with participants and identification of the researchers assumptions clearly described?	Described Not described Not reported	Comment	
6.4	Have ethical issues been addressed adequately?	Adequate Unclear Not adequate	Comment	
7.Data Analysis				
7.1	Are the data analysis inductive and the findings adequately corroborated?	Adequate Unclear Not adequate	Comment	
7.2	What type of data and statistical analysis was undertaken?			
7.3	How many of sample participated?			
8.Finding				
8.1	Are the findings internally coherent, credible (valid)?	Valid Unclear Potential bias	Comment	
8.2	Are the findings relevant?	Relevant Unclear Limited relevance	Comment	
9.Discussion				
9.1	Is there adequate discussion of study limitations?	Adequate Inadequate Not reported	Comment	

Appendix 1.3 Evaluation Literature review in diabetic foot knowledge and practice

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Gale et al. 2008	To explore beliefs about diabetic foot complications and everyday foot self-care practices	Qualitative study	Semi-structured interview, face-to-face in depth interviews Purposive sample were recruited from a large primary care health centre (n=18)	Question relating to DM, belief causes and prevention of foot complications, everyday foot-related behaviours, information/advice received about foot health, and view regarding healthcare provision	Patients	Most participants were unsure of what a foot ulcer is and unaware of the difficulties associated with ulcer healing. Prevention of accidental damage to the skin was not considered a priority, while few participants knew that this is a common cause of foot ulceration. Preventive foot care focused on stimulating blood circulation such as walking barefoot. Some of behaviours participants considered beneficial for foot health could potentially increase risk of ulcer.	Good study of design. The number of sample and the sampling is reported. There is showed that a large number of sample. The theme analysis related with the purpose of study. There are description of deeply view of patients and provided important insight. There should do the focus group
Khamsehet al. 2007	To determine the knowledge and practice of foot care in type 2 DM in Tehram, Iran	Cross-section study	148 Patients type 2DM in DM Clinic 97(65.5%)Woman, 51(34.5%)Man Not mentioned selected sample	16 Questionnaire were designed about knowledge and the current practice (foot care practice: foot self-examination, care of toenails, and foot hygiene.	Patients	-Patients Knowledge was adequate of self-care foot and lack of optimal podiatry service. Mean of knowledge score 6.6 (SD+_3) -56%not aware of the effect of smoking on the circulation to the feet,60% failed to inspect their feet, 42% did not know to trim their toe nails -High risk of practice: use of irritants to water (66.5%) and walking bare foot (62%)	Self-Report of the knowledge in perception of patients

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Sharifirad et al. 2007	To test the utility of the Health Belief Model in understanding and predicting the intention of diabetic patients in prevention of their foot lesion and amputation	Quasi experimental and cohort study	54 patients in case and 54 in control group	Questionnaire in 5 sections were collected by interview	Patients	No significant between the mean score of knowledge, perceived susceptibility, perceived severity, perceived threat, perceived benefits perceived barriers, caring of the foot and checklist in the case and control groups before intervention. But t-test difference between those two groups all variables.	It evaluated by self-report of patient. It was unable to check foot care behaviour. Although the small number of sampling, it show the effective of HBM in the study. They explained clearly the framework in this study. Need further study in another group.
Olson et al. 2009	To examine difference in self-report diabetes foot care education, self-management behaviour and barriers to good foot care among veterans with diabetes by race and ethnicity	Quantitative Study	A random sample of patients with eight VA Medical centres: 230 high risk patients. Surveys were administered by mail.	Questionnaire: The Veterans Health Administration foot care Survey on health transition, physical function, and overall health. Questionnaire Foot care risk factor, self-care behaviours, and education.	Patients	The major respondent felt not sufficiency self-foot care knowledge. There were large gaps between self-reported knowledge and actual foot care practices	-There is a comparative among national, although it showed only the self-care report of patients in descriptive study. -The respondents represent on Veterans with the lowest levels of confidence and knowledge. -Use a validate tool in USA.

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Naicker et al. 2009	To study the risk factors associated with diabetic foot and the patient's knowledge and practice	Cross sectional study	100 patients	Questionnaires including the neuropathic symptom score	Patients	-25%Patients had a low score of knowledge of diabetic foot patients with diabetic foot have more practice of foot care -The result of practice have higher mean value among patient with diabetic foot ulcer -No significant associations between knowledge of foot care and diabetic foot	-The small amount of sample. Using chi square showed the association of risk factor and fails to prove the significant. -The amount of sample was small. There are limitation of duration and subject. -Generalisation cannot show in any group.
Hasnain and Sheikh 2009	To access the knowledge and practice of diabetic patients	Cross section study	150 diabetic foot	Questionnaire regarding knowledge and practice of foot care (15 were assigned one mark. Score >705(11-15) regards as good, score 50-70% satisfactory, and less than 50% is poor both knowledge and practice	Patients	29.3% of patients had good knowledge. 40% had satisfactory knowledge and 30.7% had poor knowledge about foot care. Regarding practice of foot care only 14% have good practice, 54% had satisfactory practice and 32% had poor practices. Education of participants was significant associated with knowledge and practice of foot care.	There is a self-report of patient

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Pollock et al. 2008	To determine knowledge about foot care and practice of foot care	Cross sectional study	365 patients returned questionnaires from random sampling 550 patients. Response rate 65%	Self-administered postal questionnaires	Patients	-The mean score of knowledge was 6.5(S.D. 2.1,range 1-11) Female had a significantly higher knowledge score.-In response of knowledge for at high risk group were better than those with low risk group but no significant difference in the score. -Patients who had previously received advice or information on foot care had a significantly higher knowledge. -Particular areas of knowledge that were deficient in those that had received advice or information were in the areas of lack of sensation in the feet, proneness to ulcers and the adverse effect of smoking on peripheral circulation -Current practice in foot care -83% did not have feet measured when last purchased footwear.16.2% received advice on their purchase from the retailer	Good study of the amount of sample size.
Desalu et al 2011	To explore the knowledge of foot care and practice of diabetic foot care in patients	Cross section study	352 diabetic patient in 3 tertiary hospitals in Nigeria with type 1 and 2, no foot ulcer and diagnosed with DM at least 6 months	Structured questionnaire (base on ADA recommendation and the Diabetes UK 11 questions for knowledge of foot care and current self-care practice	Patients	30.1 have a good knowledge of foot care, 10.2% had good practice of DM foot care, 78.4% of patients with poor practices had poor knowledge of foot care, 68.8% were unaware of the first thing to do when they found redness/bleeding toes and 61.4% were unaware of the importance of the importance of inspecting the inside of the footwear for foot	Good Study of select groups in 3diffence hospital. Issue the time of collection Nov 2009-April 2010. Use the validity tool that had been used in similar previous study. Only study of description for diabetic foot care

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
						practices include. 89%not receiving advice when they bought footwear and 88.6% failing to get appropriate size footwear.	knowledge and practice is reported. There are reports of compare mean of score, Chi square test. Good report and discussion that compare with the previous study
Bell et al. 2005	To assess the level of foot self-care performed in rural multi ethic population To identify factors associated with foot self-care	Quantitative Study	Interview ½ hrs. 701 African American, Native American ad white adult form 2 rural North Carolina counties.	In home interview 5 foot self-care practice from SDSCA m functional status measures and measure education and support of foot care	Patients	Foot care practice did 6 days/week, 35.6% had foot inspected shoe, 79.2% not soaking feet No association between self-foot care and physical functioning	There is deeply discussion. The large number of patient was generated to another group of sampling.
Schmidt et al. 2008	To find out which self-care activities patients with diabetes perform to prevent diabetic foot syndrome and to look for differences between patients group	Cross sectional explorative study	269 patients-type 1and 2 DM in German	Secondary analysis of self-report data for questionnaires-3 domain with five-point Likert scale	Patients	Patient with a foot at risk for the development of diabetic foot ulcer perform more adequate self-care regarding professional assistance in foot care, but are not more active in the self-control of the feet, shoe and socks.	There is a good study in design of education programme for patients. The limitation of this study is a self-report of patients who cannot confirm of the statement was possible. The finding was limited the generalisation.

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Iversen et al. 2008	To assess the regularity of preventive care for person with diabetes in the Nord-Trondelag Health study	Cross sectioned study	1312 DM patients in aged 20 years and older in HUNT2.	questionnaires in 3 domains: a) regular DM examination ;b) regular foot inspection by health care personnel; c) regular foot inspection of their feet	Patients	85 % received regular clinical practice, 31.7% reported regular foot inspection, 66.3% reported foot self-inspection, 58.8% reported regular clinical diabetes examination	There is a self-report of patients. Using Chi square in report of preventive care in patients
Coelho et al. 2009	To understand the social representatives of the diabetic foot for people with type 2 DM	Qualitative study	10 DM patients with diagnosed 5 years or more and take a part in support group – Data analysis in two categories: 1)the foot disease with perceived alterations and present threats and2) foot care	Semi-structured 1) individual interviews 60 min- 2) support group meeting	Patients	Patients seek hopes of not developing foot diseases. Social representation of diabetic foot: Foot disease, Perception of alterations in the feet and present threats of feet disease. Feet care in care group as a concern in the future and non-care as a feeling of guilt	Using thematic analysis Using the triangulation method and technique
Akca and Cina 2008	To determine whether psychosocial adjustment to illness in both with foot ulcer and non-foot car in Turkey	A cross section survey design	200 Patients with DM type 1 and 2 who had DM at least 1 years Spited into 2 group: 100 DFU received hyperbaric oxygen and no DFU- purposive sampling	Psychosocial adjustment to Illness Scale self-report 4 point scale(PAIS-SR) face to face interview	Patients	Risk factors conducted for DFU; advanced age, low education level, long-term diabetes, poor metabolic control, and no exercise. DFU group had poor adjustment while No DFU group had moderate adjustment. No DFU had fewer problems in health care orientation, vocational environment, sexual relationship, social environment, and psychological distress than DFU group.	-Good study Find relation of psychosocial adjustment with metabolic control -Set criteria for SM sampling -Chose the chi-square, Wilcoxon sum rank to compare the difference, spearman's

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
						DFU group had poor psychosocial adjustment associated with poorer metabolic, lower education status, non-exercised and retirement. No DFU group women had better adjusted than men and who exercise had better psychosocial adjust than no exercise group.	correlation -The limitation of purposive sampling and the less number of sampling affected to generalisation to any group.
Ogbera, et al 2008	To examine feature of diabetic patient and delineate key factors for clinicians in developing countries	Observational study using the student t test	47 consecutive diabetic patients type 1,2 with foot ulcer at Urban hospital in Nigeria carried out for 2 years	Physical examination and case report form	Patients	-Patients with type 2 were older than type 1. -85% of type 2 are poor glycaemia control, Foot ulcer grade is grade 2 and 3 of Wagner classification. The risk factor is neuropathy, hypertension, Foot deformity of participant is claw toe high arching of the foot	This is only the study of characteristic of foot problem, prevalence of foot problem. This study employed the observation that increases reliability of data. The limitation of data is descriptive study. Should be a study for finding correlation.
Smide 2008	To present the outcome of clinical nurse performed foot examination in Tanzania and compare with Swedish patients	Comparative study in quantitative study	290 diabetic patients (145 patients in Sweden and 145 patients in Tanzania)	A structure foot protocol: self-reported foot problem, self-care questionnaires, outcome of clinical foot inspection, sensitivity testing	Patients	Tanzanians group have more foot problem than Swedish do. For example foot lesion sign, pain at feet or leg, impair sensation at feet. There are difference of glycaemia control between two group (Tanzania lower than Swedish)	Good study in compare sampling with age and gender. There are comparative reports of foot problem between two countries. There are report of evidence in developed countries and developing countries.

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
De Berardis et al. 2005	To investigate physician and patient practice related to foot care in Italy	Cross section study	3456 patients Selected by stratified Random list in diabetes patient clinic recruited by 125 diabetic out patients clinic and 103 general practitioners	Patients filled the questionnaire (the presence and severity of diabetes complication)	Patients and nurse role	6.8% suffered from lower limb complication Prevalence of foot complication was significant higher in older group, with low level education and income, in divorced/ widow individual. 31% did not understand the meaning of foot care 50% patients reported that had not received foot examination by physician. 28% had not received foot education 33% of patients did not perform foot self-examination. GPs tend to perform foot examination less frequency than diabetologists do.	Good studies: use sampling and a large number of DM Find correlation
Perrin et al. 2009	To investigate the association between foot care self-efficacy belief, actual foot care behaviour and foot pathology	Cross section study in Australia	96 diabetic and diagnosed loss of protective sensation in their feet	Self-report questionnaire of foot care self-efficacy belief- behaviour (developed by Vileikyte)	Patients	There are small correlation between self-efficacy belief and preventive behaviour. No association between self-efficacy beliefs and potentially damaging behaviour. Both Patients who had a history of foot problem and no history was not different in self-efficacy belief	There is clearly discussion of finding. Good literature that provided many evidence. Explained the process of the study.

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Rerkasem et al 2004	To identify the prevalence risk factors commonly identified in the literature	Descriptive survey cross section study	245 patients no foot ulcer	Data recorded by medical doctor	Patients	The percentage of neuropathy, history claudication, and poor glycaemia control is 19.2, 5.7 and 79.7 % respectively. The risk factor for DM foot ulcer is neuropathy, peripheral vascular disease, biomechanical factor, deformity and poor glycaemia control	-Fair study: only report study prevalence of foot problem. -No statistic used in this study. This is report of medical records.
Tantisiriwat and Janchai 2008	To study common foot problem presents in diabetic foot clinic	Retrospectively review study	150 patients who visited the diabetic foot clinic between 2004 and 2006	Diabetic foot evaluation form of patients, foot examination	Patients	32% had lower amputation in toe that is the most common level. The percentage of four Foot problems is 67.3% in dermatological, 79.3%in neuropathy, 74% in musculoskeletal and 39.3% in vascular problem 47 % of patients have high risk for foot amputation	Good report of prevalence of foot problem and categorised foot classification
Rerkasem et al 2008	To determine whether intensive treatment and education strategies for diabetic patients with ulcer help in preventing leg amputation	Quantitative study	73 patients received protocol and 110 patients receive the standard foot care	Standard care, Self foot care	Patients	Incidence of major amputation in the protocol and standard care group was 4.1 and 13.6% respectively	Fair study of methodology. Not specific of type of research. No research question. Compared the participant each group; the amputation rate of protocol group from 2005-2006 and the standard group from 2003-2005

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Fujiwara et al 2011	To assess the effectiveness of a preventative foot care nursing programme for diabetic patient	Quasi-experimental study	88 DM patients who attend the foot care programme. The criteria of high risk status	Foot care programme based on IWGDF risk classification programme	Patients	Reduce the severity score of tinia pedis and improved callus grade. No recurrence of callus related to foot ulcer in high risk group 3.	Good study: Sampling is a large number of testing foot care programme, the long duration of following up sample, clearly explain intervention.
Perrin and Swerissen 2008	To purpose a model that describe the influences on the behaviour and psychological functional of people at risk for diabetes-related foot complication	Systemic review	Searching relevance of article in Medline 1950-2005 CINAHL 1982-2005	The research question to reflect the reciprocal relationship between the environment, personal, and behaviour foot complication	Patients	-Certain behaviour can prevent diabetes foot complication -Education seems to have a short term positive impact on foot care behaviour and may reduce the risk of foot ulceration and amputation.	There is a fair report. Not mentioned the number of article in systemic review.

Appendix 1.4 Evaluation of practice guideline for diabetes foot care

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding	Comment
Anichinie et al.2007	To determine the impact of the application of in Tuscany, Italy	Prospective Study	Extracted data from the DRG Tuscany database over 5 years	ICDF guideline implement , Incidence rate of amputation, admission rate, length of stay	Nurse, Health care provider	-The prevalence for diabetic foot amputation increase -There are a progressive reduction in duration of hospital stay from 1999 to 2003 was 19.5 day in 1999, 15 days in 2000, 14 days in 2001	There is only explanation of effectiveness of ICDF implementation. There is a show of foot problem incidence. It should assess the satisfaction of patients, health care provider or the problem or barrier of implement that should be benefit in future.
Ritchie and Prentice, 2011	To explore of nurses perceptions regarding the implementation of a best practice guideline in Ontario , Canada	Qualitative study	14 nurses who was in the haemodialysis unit, which BPG was implement. Recruited via mail all staff on haemodialysis unit	Three focus group conducted 3-6 months and one individual interview	Nurses	-Data analysis in 3 themes: 1)Practice initiative: Foot assessment was highlight as a major practice 2) Impact of practice initiative: BPG impact on wound healing was positive 3) Implementation challenges: staff issue, time constraints, patients complexity and follow-up gap	This is a good article. The data of interview explained the good evidence. Selecting sample in this study is clearly and the data interview showed the validity and reliability.
Wright et al 2004	To design a multidisciplinary, evidence based, clinical guideline for assessing, investigating, managing acute foot care complication	Systemic review	Searching all data major electric database and hand searching. 266 papers were reviewed.	Four team leader to review all the article identified in the systemic search, assessed for relevance and graded the level and quality of evidence (Two external experts was utilized)	Nurses Health care provider	-The multidisciplinary team was used to create a comprehensive guideline. The guideline is specific classification systems that record the absence and prioritise the risk factor for foot ulcer. -No universally accepted, peer review, evidence base guideline for the clinical assessment, investigation and management of the diabetic foot -Although a number of classification systems for foot ulcer have been developed, no one system has been universal accepted.	The number of study is rich and enough sufficiency. The detail of exclusion and inclusion criteria was not clearly but the searching searched in many database which is provide the good relevance data in this issue. The literature review is clearly

Appendix 1.5 Patient knowledge and Practice of diabetic foot ulcers

Name	Aim	Method ology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
Gale et al. 2008	To explore beliefs about diabetic foot complications and everyday foot self-care practices	Qualitati ve study	Semi-structured interview, face-to-face in depth interviews Purposive sample were recruited from a large primary care health centre (n=18)	Question relating to DM, belief causes and prevention of foot complications, everyday foot-related behaviours, information/advice received about foot health, and view regarding healthcare provision	Patients	Most participants were unsure of what a foot ulcer is and unaware of the difficulties associated with ulcer healing. Prevention of accidental damage to the skin was not considered a priority, while few participants knew that this is a common cause of foot ulceration. Preventive foot care focused on stimulating blood circulation such as walking barefoot. Some of behaviours participants considered beneficial for foot health could potentially increase risk of ulcer.
Khamseh et al. 2007	To determine the knowledge and practice of foot care in type 2 DM in Tehram, Iran	Cross-section study	148 Patients type 2DM in DM Clinic 97(65.5%)Woman, 51(34.5%)Man Not mentioned selected sample	16 Questionnaire were designed about knowledge and the current practice (foot care practice: foot self-examination, care of toenails, and foot hygiene.	Patients	Patients Knowledge was adequate of self-care foot and lack of optimal podiatry service. Mean of knowledge score 6.6 (SD+_3) 56%not aware of the effect of smoking on the circulation to the feet, 60% failed to inspect their feet, 42% did not know to trim their toe nails High risk of practice: use of irritants to water (66.5%) and walking bare foot (62%)
Sharifirad et al. 2007	To test the utility of the Health Belief Model in understanding and predicting the intention of diabetic patients in prevention of their foot lesion and amputation	Quasi experime ntal and cohort study	54 patients in case and 54 in control group	Questionnaire in 5 sections were collected by interview	Patients	No significant between the mean score of knowledge, perceived susceptibility, perceived severity, perceived threat, perceived benefits perceived barriers, caring of the foot and checklist in the case and control groups before intervention. But t-test difference between those two groups all variables.

Name	Aim	Method ology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
Olson et al. 2009	To examine difference in self-report diabetes foot care education, self-management behaviour and barriers to good foot care among veterans with diabetes by race and ethnicity	Quantitat ive Study	A random sample of patients with eight VA Medical centres: 230 high risk patients. Surveys were administered by mail.	Questionnaire: The Veterans Health Administration foot care Survey on health transition, physical function, and overall health. Questionnaire Foot care risk factor, self-care behaviours, and education.	Patients	The major respondent felt not sufficiency self-foot care knowledge. There were large gaps between self-reported knowledge and actual foot care practices.
Naicker, A et al. 2009	To study the risk factors associated with diabetic foot and the patient's knowledge and practice	Cross sectional study	100 patients	Questionnaires including the neuropathic symptom score	Patients	25%Patients had a low score of knowledge of diabetic foot patients with diabetic foot have more practice of foot care - The result of practice have higher mean value among patient with diabetic foot ulcer No significant associations between knowledge of foot care and diabetic foot
Pollock et al. 2008	To determine knowledge about foot care and practice of foot care	Cross sectional study	365 patients returned questionnaires from random sampling 550 patients. Response rate 65%	Self- administered postal questionnaires	Patients	-The mean score of knowledge was 6.5(S.D. 2.1,range 1-11) Female had a significantly higher knowledge score.-In response of knowledge for at high risk group were better than those with low risk group but no significant difference in the score. -Patients who had previously received advice or information on foot care had a significantly higher knowledge. -Particular areas of knowledge that were deficient in those that had received advice or information were in the areas of lack of sensation in the feet, proneness to ulcers and the adverse effect of smoking on peripheral circulation -Current practice in foot care -83% did not have feet measured when last purchased footwear.16.2%

Name	Aim	Method ology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
						received advice on their purchase from the retailer
Desalu et al 2011	To explore the knowledge of foot care and practice of diabetic foot care in patients	Cross section study	352 diabetic patient in 3 tertiary hospitals in Nigeria with type 1 and 2, no foot ulcer and diagnosed with DM at least 6 months	Structured questionnaire base on ADA recommendation and the Diabetes UK 11 questions for knowledge of foot care and current self-care practice	Patients	30.1 %have a good knowledge of foot care, 10.2% had good practice of DM foot care, 78.4% of patients with poor practices had poor knowledge of foot care, 68.8% were unaware of the first thing to do when they found redness/bleeding toes and 61.4% were unaware of the importance of the importance of inspecting the inside of the footwear for foot practices include. 89%not receiving advice when they bought footwear and 88.6% failing to get appropriate size footwear.
Hasnain and Sheikh 2009	To access the knowledge and practice of diabetic patients	Cross section study	150 diabetic foot	Questionnaire regarding knowledge and practice of foot care (15 were assigned one mark. Score >705(11-15) regards as good, score 50-70% satisfactory, and less than 50% is poor both knowledge and practice	Patients	29.3% of patients had good knowledge. 40% had satisfactory knowledge and 30.7% had poor knowledge about foot care. Regarding practice of foot care only 14% have good practice, 54% had satisfactory practice and 32% had poor practices. Education of participants was significant associated with knowledge and practice of foot care.

Appendix 1.6 Practice for foot care of people with diabetic and risk factors for diabetic foot

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
Bell et al. 2005	To assess the level of foot self-care performed in rural multi ethic population To identify factors associated with foot self-care	Quantitative Study	Interview ½ hrs	Survey data	Patients	Educating patients with foot self-care may encourage routine foot care but that those dependent on either formal or informal support to perform foot care do so less frequently than those who perform it independently
Schmidt et al. 2008	To find out which self-care activities patients with diabetes perform to prevent diabetic foot syndrome and to look for differences between patients group	Cross sectional explorative study	269 patients type 1and 2 DM in German	Secondary analysis of self-report data for questionnaires-3 domain with five-point Likert scale	patients	Patient with a foot at risk for the development of diabetic foot ulcer perform more adequate self-care regarding professional assistance in foot care, but are not more active in the self-control of the feet, shoe and socks.
Iversenet al 2008	To assess the regularity of preventive care for person with diabetes in the Nord-Trondelag Health study	Cross sectioned study	1312 DM patients in aged 20 years and older in HUNT2.	questionnaires in 3 domains: a) regular DM examination ;b) regular foot inspection by health care personnel; c) regular foot inspection of their feet	Patients	85 % received regular clinical practice, 31.7% reported regular foot inspection, 66.3% reported foot self-inspection, 58.8% reported regular clinical diabetes examination
Coelho et al.2009	To understand the social representatives of the diabetic foot for people with type 2 DM	Qualitative study	10 DM patients with diagnosed 5 yrs or more and take a part in support group – Data analysis in two categories: 1)the foot disease with perceived	Semi-structured 1)individual interviews 60 min-2) support group meeting	Patients	Patients seek hopes of not developing foot diseases. Social representation of diabetic foot: Foot disease, Perception of alterations in the feet and present threats of feet disease. Feet care in care group as a concern in the future and non-care as a feeling of guilt

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
			alterations and present threats and2) foot care			
Akca and Cina 2008	To determine whether psychosocial adjustment to illness in both with foot ulcer and non foot car in Turkey	A cross section survey design	200 Patients with DM type 1 and 2. Who had DM at least 1 years Spited into 2 group: 100 DFU received hyperbaric oxygen and no DFU- purposive sampling	Psychosocial adjustment to Illness Scale self-report 4 point scale(PAIS-SR) face to face interview	patients	Risk factors conducted for DFU; advanced age, low education level, long-term diabetes, poor metabolic control, and no exercise. DFU group had poor adjustment while No DFU group had moderate adjustment. No DFU had fewer problems in health care orientation, vocational environment, sexual relationship, social environment, and psychological distress than DFU group. DFU group had poor psychosocial adjustment associated with poorer metabolic, lower education status, non exercised and retirement. No DFU group women had better adjusted than men and who exercise had better psychosocial adjust than no exercise group.
Ogbera et al 2008	To examine feature of diabetic patient and delineate key factors for clinicians in developing countries	Observational study using the student t test	47 consecutive diabetic patients type 1,2 with foot ulcer at Urban hospital in Nigeria carried out for 2 years	Physical examination and case report form	Patients	-Patients with type 2 were older than type 1. -85% of type 2 are poor glycaemia control, Foot ulcer grade is grade 2 and 3 of Wagner classification. The risk factor is neuropathy, hypertension, Foot deformity of participant is claw toe, high arching of the foot
Smide 2008	To present the outcome of clinical nurse performed foot examination in Tanzania and compare with Swedish patients	Comparative study in quantitative study	290 diabetic patients (145 patients in Sweden and 145 patients in Tanzania)	A structure foot protocol: self-reported foot problem, self-care questionnaires, outcome of clinical foot inspection, sensitivity testing	Patients	Tanzanians group have more foot problem than Swedish do. .For example foot lesion sign, pain at feet or leg, impair sensation at feet. There are difference of glycaemia control between two group (Tanzania lower than Swedish)
Perrin et al. 2009	To investigate the association between foot care self-efficacy belief, actual foot care behaviour and foot	Cross section study in Australia	96 diabetic and diagnosed loss of protective sensation in their feet	Self-report questionnaire of foot care self-efficacy belief- behaviour (developed by Vileikyte)	Patients	There are small correlation between self-efficacy belief and preventive behaviour. There is no association between self-efficacy beliefs and potentially damaging behaviour. Both Patients who had a history of foot

Name	Aim	Methodology	Method of data collection, (subject, setting	Instrument	Patients/ Nurse perception	Finding
	pathology					problem and no history was not different in self-efficacy belief
De Berardis et al.2005	To investigate physician and patient practice related to foot care in Italy	Cross section study	3456 patients Selected by stratified Random list in diabetes patient clinic recruited by 125 diabetic out patients clinic and 103 general practitioners	Patients filled the questionnaire (the presence and severity of diabetes complication)	Patient and nurse role	6.8% suffered from lower limb complication Prevalence of foot complication was significant higher in older group, with low level education and income, in divorced/ widow individual. 31% did not understand the meaning of foot care 50% patients reported that had not received foot examination by physician. 28% had not received foot education 33% of patients did not perform foot self-examination. GPs tend to perform foot examination less frequency than dialectologists do.

Appendix 1.7 Evaluation patients education programme for diabetic foot care

Name	Aim	Methodology	Method of data collection, (subject, setting)	Instrument	Patients/ Nurse perception	Finding	Comment
Marthinez, and Tripp-Reimer 2005	To identify diabetes nurse educator's perceptions of most important foot care in elderly patients	Qualitative study	Stratified random sampling of 90 diabetes nurses -Data transcript and coded into categories and domain using descriptive content analysis	A structured opened-ended questionnaire	Nurses	Participants reported total 346 foot care behaviours. Four domain- categorised group of descending importance behaviours: foot /nail care, footwear/shoes, general health and foot emergencies	Clearly explained research process in design study, subject recruitment
Flood2009	To describe the effect RN-patients interaction on diabetes foot care-related outcome and compare interactions across the two practice setting of acute care and home health	Correlation quantitative study	Employed nurse management	3 Instruments	Nurses	Nurse in home health care is greater significantly of interaction with DP in effective support, decision control and health information -Nurse patient interaction related with diabetic foot in acute care and health care setting	There are research question, explain the gap of study and good evidence support in literature.
Bowman 2008	To examine how the presence of neuropathy affects exercise participation in elderly diabetic patient	Cross sectional design Quantitative study	Secondary analysis of 427 elderly diabetic patients A survey was mailed to a random sample Using descriptive statistic and non-parametric	Self-report Survey were piloted and tested to find validity	Patients	Patients with neuropathy had significantly lower score for health functioning and for positive beliefs about exercise than those non-neuropathy. They had high score of receipt of diabetes-specific exercise and exercise-relate injuries, including foot injuries.	-The study were random to sample 1247 patients. -The survey tool were reviewed validity. Good study: large randomly generate sample

Quarles 2005	To examine whether teaching diabetic foot care with a demonstration increased self-efficacy for managing foot care and implementation of foot care	Ex post factor research study	150 diabetic patients	A questionnaire	Patients	There was a significant difference between method of teaching group at the p<.05 level predicting self-efficacy. There is significant difference between the methods of teaching group. Show that continued support was significant in predicting self-efficacy for managing foot care	There is a large number of sampling. Literature review showed the relevant evidence in self-efficacy study
Corbett 2003	To test effectiveness of an educational intervention to improve patients' foot care knowledge, self-efficacy and self-care practice	A prospective randomized control	2 group design with convenience sample of 40 home care patients from a Medicare certified home health agency	Measure Foot care knowledge, self-efficacy and report self-care	Patients	The educational intervention improved patient's knowledge, confidence, and reported foot care behaviour.	There are many evidence in literature review. Use the self-reported of patients. The study showed the important of education on the patient knowledge.
Calle-Pascual 2002	To assess efficacy of a preventive foot care programme, applied in a normal outpatients setting to decrease the incidence of foot ulcers in people with diabetes diagnosed as having neuropathy by neuropathy disability score	Prospective clinical based study in Madrid	308 patient with diabetes -selected the patients who were first ulcer to study	Continue Foot education programme evaluated at least every 6 months -Questionnaires (Adapted)	Patient	308 with neuropathy, A low risk group n=124 has a VPT<25V while 184 had VPT>25 in high risk group. All 220 complied with the foot programme -Diabetic patients who complied with the foot care programme had between a lower risk of ulceration than who did not follow programme.	The study show and discuss the interesting issue. No detail of questionnaires

Mcinnes et al 2011	To define and agree a practical educational framework for delivery by all healthcare professionals management patient with diabetes	Qualitative study	Relevant paper were disseminated to the panel for review	Consensus meeting- multidisciplinary team: diabetologists, podiatrists, a pharmacist, a psychologist and a general practitioner	Patients	Four main health behaviours were identified for those at low risk of developing foot complications: control of blood glucose levels, attendance at annual foot screening examination, reporting of any changes in foot health immediately and the engagement in a simple daily foot care routine	Good study: discussion of finding, literature review. Using expert to discuss the finding consensus by meeting
Slot et al 2011	To investigate the knowledge of nursing staff regarding foot care, their foot care activities, and the health of residents feet in a nursing home before and after intervention	Cross section study	16 nurse staffs were received the foot care programme, And 43 residents were evaluated foot care activities and the health of resident's feet	Foot care Educational programme (lecture and demonstrations) -	Nurses	Foot care knowledge of nursing staff and foot care activities had partially improved as seen in residents' skin health	Sampling of the study is less number. This study cannot generalise.

Appendix 1.8 Evaluation impact of practice guideline

study	Issue of guideline	Aim	Design	Sampling Participants	Result	Comment
Alanen et al. 2008	Hypertension	To assess the style of implementation and adoption of the HT guideline	Postal questionnaire to 409 nurses	Nurse group N= 327 in senior nurses who used in the implementation	The recommendation in HT guideline was adopted in clinical practice with varying success and slightly more often in implementer health centres than in disseminator health centres. Multiple channel had been used in the implementation Impact on clinical practice Creating a new division of labour between nurse and doctors	This study showed the impact on clinical patient outcome. Implementation should be used multiple channel.
Bassa et al. 2005	Hypercholesterolemia	To assess the impact on the effectiveness and costs of practice guideline implement	Prospective, naturalistic, single centre, before and after design	500 patients with hypercholesterolemia	-The proportion of patients meeting the treatment goals increased by 11.9% -The median LDL values decreased by 10 mg/dl -The proportion of patients treated with drugs decreased -The mean total costs per patient decreased by euro 78.4	This study showed the positive outcome of clinical guideline
Cervo et al. 2012	PNA pain management tool	To examine the effect of incorporating the CPAT into and AMDA long term pain management To evaluate changes in CPAT scores after treatment for pain	Non randomize pre-post intervention	N/A	-Reduce falls, verbally aggressive behaviour -Reduce antipsychotic usage in dementia group	It is not clear evidence whether effective or not.
Coffey et al. 2011	Score for an alcohol withdrawal guideline in burn group	To determine the impact of implementation of evidence	A retrospective medical record review Collected data 1 year before	Burn patients (n=428) Document of screening and treatment of alcohol	No different in the experience of alcohol withdrawal after guideline implementation	After implementation not difference in burn injury This is no impact of guideline

			implementation and 1 year after implementation	abuse		
Collin-Emeric et al 2007	CPGS of NHs	To identify barrier to and facilitator of the differs on CPGS	Quality analysis With four randomly selected community nursing home	Nurses , NHs Staff (N=35) were interviewed	-None of the NHs systematically adopted CPGs--Confusion with other document and regulation	Explained the problem of implementation: checklist should take off or patients or staffs
Greene 1997	Cancer Pain management	To describe the level of adoption of the AHCPR clinical practice	Correlation descriptive study	Practice nurses =360 were survey	-The level of adoption was low. Respondents were aware of but not using the practice guideline. -Nurse perceived that they were fairly effective as change agent and opinion leaders, lacking of time and cooperation of physicians and administrations constrained their authority and effectiveness in changing pain management	This study showed the perception of nurse using guideline and showed the barrier of implementation such as time, cooperation, authority. This is 360 survey studies and generalise the data.
Higuichi et al 2007	Adult asthma care best practice guideline and the reducing foot complications for people with DM best practice	To report on a three year follow up evaluation in Canada of nursing care indicators	Longitudinal follow up study- 3 years study	Two hospital setting	Impact on the delivery of care in hospital and community setting	Show the positive guideline. It seems to work in delivery guideline.
Kotagal et al 2002	Bronchitis guideline	Determine impact of a multisite implementation of an evidence based clinical practice guideline	Before and after study Intervention of guideline	846 control children patients, 792 study patients in 7 hospital	-Length of stay decrease significant -Reduce the number of patients who received treatment of albutanral, bronchodilator -Hospital readmission decrease -save money	The positive outcome of guideline in issue of day stay in hospital, readmission, treatment rate
Kraus,V 1997	preventive Diabetic foot care education and referral for	To evaluate the cost-effectiveness of a nursing practice guideline	Experimental design in 2 groups: experimental group and control group	Evaluated the DFC knowledge, DF behaviour, lower extremity health	-To be effective in improving diabetic foot care knowledge, diabetic foot care behaviour, and lower extremity health status.	Positive outcome of foot care guideline Cost effectiveness outcome

	specialty care	for preventive diabetic foot care.		status	-The cost of implementing the practice guideline was higher than usual clinic care but would be justified by the cost-savings realized through the prevention of lower extremity amputations in persons with diabetes.	
Meerwijk et al. 2010	Suicide patients with Schizophrenia	To develop and test an evidence-based guideline	Systemic review of literature	21 mental health nurses	-Support discussing suicide with patients and assessing suicide risk	It is not strong study paper
Mitchell et al. 2011	NICE depression guideline	To Explore the impact of the QOF on diagnosis and management of depression in routine practice	Qualitative study using four focus group using a topic guide and audiotaping	38 participant (GP Nurse doctors in training, mental health workers, and a manager)	-Embedded principles of holism and evidence-based practice was viewed positively but its impact was compromised by resource and practitioner barriers -The imposition of the screening questions and severity assessment (PHQ-9_ with no responsive training had required practitioners to work hard to minimise negative impacts on their work. -Positively management how the patients were labelled.	This study show the factor of difficultly implement, time, facility
Murphy-Oikoren et al. 2012	Guideline for infants with neonatal abstinence syndrome	To evaluate the effectiveness of a clinical practice guideline on increasing identification of neonates with neonatal abstinence syndrome	A retrospective cohort comparison design	Hospital record data from neonates born in the 6 months prior to and neonates born in the 6 months following the implement of guideline	-Significant decreases the overall NAS score and significant difference in the number of measures taken over time between groups increasing identification of neonates with NAS symptoms based on a toxicology screening protocol -decreasing the means of NAS -significant overall reduction the length of hospital admission	Show the study success manage the good outcome; increasing identification, decreasing the mean NAS score and decreasing the average length of hospital admission
Prentice et al 2009	Diabetic foot management guideline	To examine the impact of RNAO BPG of foot care guideline	The data collection of foot care incidence, recurrence and	57 patients from haemodialysis unit participant in the study.	The number of wounds were significant reduction from time one to time three. The grade of wound was significant	Show the positive impact of guideline in grading wound.

			amputation rate at three points in time over a 15 month period		change.	
Sae-Sia et al. 2012	Guideline for multiple injury patients	To develop and evaluate a clinical nursing practice guideline for the initial assessment of multiple injuries	CNPG was developed using evidence base knowledge of trauma assessment and the advanced trauma Life support guideline	18 nurses who worked in the trauma word and implement 34 multiple injury -outcome use self-reported compliance of using guideline, nurse satisfaction with using CNPG -Percentage of missed injury	-72.2 % of nurses are satisfied with using the CNPG at high level. -Missed injuries were discovered at a rate of 14.6% of the total injuries diagnosed in the injured patients within 24 hour of ward admission CNPG could be more widely applied to improve the quality of care and increase the safety of those with multiple injuries.	Most nurses applied clinical guideline. This study showed the positive outcome in issue of missed injury.
Shravat et al. 2006	Head Injury management	To determine the impact on the workload of a district general hospital	Retrospective audit of all patients attend ER with head injury over 3 month period	Case notes and electronic record were reviewed to determine whether the CT was indicated in line the NICE -Compared workload with an identical audit performed before the implementation of the NICE guideline	17472 patients attending in the ED and 472 with head injury. CT scan indicated in 36. The admission rate was unaltered. The positive predictive value of NICE was 17.1% compared with 25%	This guideline increase cost. Guideline had impacted on more predictive value of guideline.
Thibault-Halman et al. 2011	Major traumatic brain injury	To evaluate impact on timely access to definitive care	Prospectively and stored in the Nova Scotia Trauma Registry and the Emergency Health Services Communications and Dispatch	N 388 To access the intervals from admission to a referring hospital to access to tertiary care, -compared for the	-No statistically different after Guideline implement of time elapsed before calling the provincial Trauma -Time to tertiary care are lengthy and have not reduced by guideline implementation	This study showed negative effectiveness of guideline.

			Centre database were analysed for patients with head abbreviated injury scale.	periods before guideline implement, the implement phase and after implement		
Turrill 2000	Evidence-based nursing practice	To determine the factors which influence the production of nursing practice guideline	A situational analysis with the application of document evidence and semi structured interviews	N/A	Provision of appropriate resource of times, staffing levels and facilities impact heavily on the ability of nurse to produce evidence-based guidelines document. In order to developing quality of care should give practice based, continuing education programme and academic.	Show the gap of idea in implementation. Issue of training with practice or academic and continuing education were still not clearly.
Webster 2002	Delirium practice guideline	To test the impact on practice guideline-driven improving clinical recognition, management and outcomes in elderly pt with delirium	Intervention and measurement One floor was as a control site Two floors were designed for intervention	Participants i)124 acute confused older patients ii) house staff, attending faculty physicians and medical nurse providing care iii) a geriatric delirium team care	Phase 1 distribute guideline to physician-the finding no improved outcomes in control unit Phase 2 a geriatric physician/nurse delirium care team used the guidelines and consult directly with nurse-the finding show the significant better in the intervention group- length of stay shorter by 1.7 day and fewer consultant. No different of death incident, use of restraints, and use of neuroleptic or nursing home placement. Cost saving was reported.	The positive of clinical guideline. There are a good methodology and clearly step of implementation with 3 steps in 2 phase study.

Appendix 1.9 Delphi technique in health science and nursing

Name	Title	Panel expert	Delphi Technique	Purpose of the Delphi technique
Jirwe et al.2009	Identify the core components of cultural competence: findings from a Delphi study	24 experts purposive sampling (8 nurses, 8 researchers and 8 lecturers)	4 round Delphi technique: first round using interview, Round2-4 using questionnaires 75% consensus	To identify knowledge, skills and attitude
Irvine 2005	Exploring district nursing competencies in health promotion: the use of the Delphi Technique	72 experts of primary health care: GP, practice, nurses, HVs, DNs, community nurse manager, DN community practice teacher, district nursing student, lecturer in districts nurse	3 rounds of process: round 1 ask 2 questions and use thematic content analysis to get 181 statements Round 2 questionnaire 181 statement using 5 Likert scale Round3 questionnaire return to 71 experts and return back 56 response Consensus at mean 4 and above and SDs at 1.2 of consensus	To establish the competencies of district nurses in effective role of health promotion To find a response relating to a board subject areas
Chang et al. 2010	A Delphi study to validate an Advanced practice Nursing tool	16 nurse (clinicians, educators, APNs and senior directors, managers, and represented rural, remote and metropolitan setting	3 rounds with questionnaires with 5 Likert scale Round 1 the tool based on the strong model Round 2 , Round 3	To response the practice of APN and indicate agreement
Peters,J et al. 2001	What role do nurse play in Type 2 diabetes in the community care: a Delphi study	97 practice nurses 69 diabetes special nurses	2 rounds Round 1 current practice and future role Round 2 summarized responses opinion	To explore the perceptions current practice and future role of nurse in diabetic management
Wilson et al 2010	Research priorities for nursing care of instants, children and adolescents: a west Australia Delphi study	127 Register nurse with randomly selected sample	A Classic Delphi technique with three round questionnaires	To identify research priorities for the care of infants, children and adolescence,
Efstathiou et al 2008	A Delphi study to identify healthcare users' priorities for cancer care in Greece	30 healthcare (15 cancer patients and 15 carers) user from 4 hospitals in Athens, Greece Purposive convenience sample	A classical Delphi technique Two round questionnaires with Likert Sale	To elicit a response relating to a broad subject areas.

Name	Title	Panel expert	Delphi Technique	Purpose of the Delphi technique
Lofmark andThorell-Ekstrand 2004	An assessment form for clinical nursing education: A Delphi study	35 Swedish strategically selected nurse scientists to invite. Only 30 panel were response	Two rounds questionnaires	To develop further the existing assessment form by asking participant with up-to-date knowledge about changes within the nursing professional

Appendix 1.10 Delphi technique in developing clinical guideline

Name	Title	Purpose of the Delphi technique	Panel expert/selecting	Delphi Technique
Rolley et al. 2010	Guideline NC for people undergoing per cutaneous coronary intervention	To review existing evidence	41 panel expert (39 cardiovascular nurse and 2 consumer representatives)	Modified to review exiting evidence 2 Round by email
Ostaszkiewicz et al. 2008	A guideline for the nursing assessment and management of urinary retention in elderly hospitalised patients	To elicit information and expert comments from participants in an iterative way so as to facilitate problem solving, planning and decision making.	N/A multidisciplinary expert	Modified Delphi T. 3 Round
Morita et al. 2005	a Clinical Guideline for Palliative Sedation Therapy Using the Delphi Method	To construct a clinical guideline for palliative sedation technique To help clinician adequately perform sedation and ensure better quality care	19 multidisciplinary experts (five palliative care physicians, four nurses, two oncologists, two psychiatrists, two anesthesiologists, two bioethicists, a medicalsocial worker, and a lawyer).	3 Rounds Literature review
Barker and Burns 2001	Using consensus Technique to produce clinical guideline for patients treated with the llizarov Fixator	To refine and elicit expert panel opinion	12 physiotherapists expert to produce draft guideline statements about practice	Interview 3 rounds
Linde et al. 2005	Use of the Delphi Technique for developing national clinical guidelines for prescription of lower-limb prostheses	To develop guideline	32 members of physician, prosthetists and physiotherapist who specialize in rehabilitation of amputee and prosthesis prescription	3 sources of evidence: systematic review, survey of clinical practice, interview with experts 2 round for postal to internet

Appendix 1.11 Panel experts

Name	Purpose of the Delphi technique	Number of expert	selecting	Criteria for selecting
Rolley et al. 2010	To review existing evidence	-41 panel expert (39 cardiovascular nurse and 2 consumer representatives) (use other group to do consensus development conference)	Purposive sampling Contact by mail with group of profession group	Cardiovascular health professional working in policy, practice or research or a health consumer -experience in representing consumer needs
Ostaszkiewicz et al. 2008	To elicit information and expert comments from participants in an iterative way so as to facilitate problem solving, planning and decision making.	N/A multidisciplinary expert	Not mentioned	Not mentioned
Morita et al. 2005	To construct a clinical guideline for palliative sedation technique	19 multidisciplinary experts (five palliative care physicians, four nurses, two oncologists, two psychiatrists, two anaesthesiologists, two bioethicists, a medical social worker, and a lawyer).	Purposive sampling	Member of the sedation Guideline Task Force were selected from national distinguished expert
Barker and Burns 2001	To refine and elicit expert panel opinion	12 physiotherapists expert to produce draft guideline statements about practice	Selecting from the major centre	Experience in paediatrics, adults, trauma and specialist elective surgery
Linde et al. 2005	To develop guideline	32 members of physician, prosthetists and physiotherapist	Not mentioned	Specialize in rehabilitation of amputee and prosthesis prescription in Netherland
Jirwe et al.2009	To identify knowledge, skills and attitude in Sweden	24 nurses (8 nurses, 8 researchers and 8 lecturers)	-Purposive sampling from universities across Sweden -Recruited from a range of healthcare settings in Stockholm area for example acute care, care of older people and community cares –	-Knowledge of multicultural issue /work with multi cultural population/teaching cultural issue/involved in research field of multicultural

Name	Purpose of the Delphi technique	Number of expert	selecting	Criteria for selecting
			snowball technique to identify additional nurses working in multi-cultural contexts	
Irvine 2005	To establish the competencies of district nurses in effective role of health promotion	72 experts of primary health care: GP, practice, nurses, HVs, DNs, community nurse manager, DN community practice teacher, district nursing student, lecturer in districts nurse	Purposive sampling and snowball sampling nurse who working throughout wales	in Wales
Change et al. 2010	To response the practice of APN and indicate agreement	16 nurse (clinicians, educators, APNs and senior directors, managers, and represented in rural, remote and metropolitan setting	Purposive stratified samplings	-Knowledge about and familiar with the parameters of professional nursing practice and health service workforce requirement and credible with profession -work at APN level, involving in decision of APN service -building on previous work in the field
Peter et al. 2001	To explore the perceptions current practice and future role of nurse in diabetic management	97 practice nurses 69 diabetes special nurses	-Random stratified sample of practice nurse from nurse on the British Diabetic Association's database -Random one third of diabetes nurse from the same database	-An English National Board for nursing and midwifery, study programme qualification in diabetes nursing -Experience of running diabetes clinic for at least 2 years -A job description including extra responsibility for the diabetes management -interest in the management of diabetes which has been demonstrated in practice
Wilson et al.2010	To identify research priorities for the care of infants, children and adolescence	217 Register nurse at the sole tertiary referral hospital for children and adolescent in Western Australia This consists of beside nurses, nurse specialist and nurse management	Stratified randomly selected sample	-one year experience in hospital -who were baccalaureate prepared an considered to have sufficient expertise to provide valued opinions in relation of clinical practice

Name	Purpose of the Delphi technique	Number of expert	selecting	Criteria for selecting
Efstathiou et al 2008	To investigate healthcare users' views on cancer care services in Grace and prioritise those areas that needed to be developed or improved	30 healthcare (15 cancer patients and 15 carer)	-purposive convenience sample	Carer selectin-based on their knowledge and experience of living with cancer or caring for a cancer patients and using cancer service. Patients who had been diagnosed with cancer or caring for cancer patients for at least a year.
Lofmark and Thorell-Ekstrand 2004	To develop further the existing assessment form by asking participant with up-to-date knowledge about changes within the nursing professional	35 Swedish nurse scientists to invite. Only 30 panel were response	strategically selected	-Nurse researcher in clinical or professional field with the position associated with nursing education at university

Appendix 1.12 Process of the Delphi technique in Health science and Nursing

Name	Title	Panel expert/selecting	Delphi Technique	Round 1 0pen	Measurement	Result
Rolley et al. 2010	Guideline NC for people undergoing per cutaneous coronary intervention	41 panel expert (39 cardiovascular nurse and 2 consumer representatives)	Modified to review exiting evidence 2 Round by email	Round 1 consensus conference and literature review	10 point Likert scale Cut off median score of 7.5	
Ostaszkiewicz et al. 2008	A guideline for the nursing assessment and management of urinary retention in elderly hospitalised patients	N/A multidisciplinary expert	Modified Delphi T. 3 Round	Not mentioned	Not mentioned	Not mentioned
Morita et al. 2005	Clinical Guideline for Palliative Sedation Therapy Using the Delphi Method	19 multidisciplinary experts (five palliative care physicians, four nurses, two oncologists, two psychiatrists, two anesthesiologists, two bioethicists, a medical, social worker, and a lawyer).	Modified 3 Literature review	Draft of guideline from Systemic literature reviewed by 6 members -145 sentence - to rare the validity on 9 point Likert type	-the revise guideline was divided into 137 sentence -Median value 8 or more and the difference between the minimum and maximum were 5 or less. For the two items in which the difference between the minimum and maximum was 6, revaluation of the revised items achieved the median value 8 or more and the minimum value of 7.	No mention response rate
Linde et al. 2005	Use of the Delphi Technique for developing national clinical guidelines for prescription of lower-limb prostheses	32 members of physician, prosthetists and physiotherapist who specialize in rehabilitation of amputee and prosthesis prescription	2 round for internet	3 sources of evidence: systematic review based on RCT, survey of clinical practice, interview with experts Developed to Round 1 consist of 45 Postulate	Round 2 asked whether panel agreed with the modified postulates or not and drafted a feedback report	Consensus> 75% 100% response in Round1 and 31 panel at round2

Name	Title	Panel expert/selecting	Delphi Technique	Round 1 0pen	Measurement	Result
Jirwe et al.2009	Identify the core components of cultural competence: findings from a Delphi study	24 experts purposive sampling (8 nurses, 8 researchers and 8 lecturers)	4 round Delphi technique:	first round semi-structure interview (face to face)-to identify specially knowledge, skill and attitude content analysis,	Round2-4 using constructed questionnaires using 7 point Likert scale Analysis Mean and SD	Consensus 75% Response rate 100%
Baker and Burns 2001	Using consensus Technique to produce clinical guideline for patients treated with the llizarov Fixator	12 physiotherapists expert to produce draft guideline statements about practice	3 rounds	Round 1 unstructured and asked board open-ended questions	Round 2 and 3 9 point linear scale Mean score and Standard deviation	Consensus 80% Not mentioned repose rate
Irvine 2005	Exploring district nursing competencies in health promotion: the use of the Delphi Technique	72 experts of primary health care: GP, practice, nurses, HVs, DNs, community nurse manager, DN community practice teacher, district nursing student, lecturer in districts nurse	3 rounds of process:	-round 1 ask 2 questions and use thematic content analysis to get 181 statements	Round 2 questionnaire 181 statement using 5 Likert scale Round3 questionnaire return to 71 experts and return back 56 response Consensus at mean 4 and above and SDs at 1.2 of consensus	86% (n=62) in Round 1, 87.5% (n=63) Round2, 78.9% (n=56) in Round 3
Peters, J et al. 2001	What role do nurse play in type 2 diabetes in the community care: a Delphi study	97 practice nurses 69 diabetes special nurses	2 rounds	Round 1 statement involve current practice and future role which developed literature review (thematic analysis)	Round 2 summarized responses opinion Compare two groups with t-test and Chi-square, Mann-Whitney U test	Level agreement 85% Response rate Round 1 not mentioned Round 2 Practice nurses 90 and diabetes specialist nurse 59

Name	Title	Panel expert/selecting	Delphi Technique	Round 1 0pen	Measurement	Result
Chang et al. 2010	A Delphi study to validate an Advanced practice Nursing tool	16 nurse (clinicians, educators, APNs and senior directors, managers, and represented rural, remote and metropolitan setting	3 rounds with questionnaires with online survey	Based on the strong model of advanced practice	5 Likert scale rate 3 and above and a content validity index (CVI) was calculated from the percentage of panel ratings of 4 or 5 Consensus 75 %	100% in Round 1 92.75% (n=15)Round2
Wilson et al. 2010	Research priorities for nursing care of instants, children and adolescents: a west Australia Delphi study	127 Register nurse with randomly selected sample	A Classic Delphi technique with three round questionnaires	Round 1 –semi structured questionnaire	7 point Likert scale Round 2questionnaires 74 topic to rate the relevance of each topic Round3 questionnaires was 37 topic to rate important each item	Response rate round 1 n=47 (21.7%) round 2 n=63 (29%) round 3 n=47 (74.6%) mean ,SD level agreement at median at least 5 or >
Efstathiou et al 2008	A Delphi study to identify healthcare users' priorities for cancer care in Greece	30 healthcare (15 cancer patients and 15 carers) user from 4 hospitals in Athens, Greece Purposive convenience sample	A classical Delphi technique Two round questionnaires	An opened questionnaires	Second round asked to rate each statement in a seven Likert type scale from 1 to 7.	The response rate >80% each round
Lofmark and Thorell-Ekstrand 2004	An assessment form for clinical nursing education: A Delphi study	35 Swedish strategically selected nurse scientists to invite. Only 30 panel were response	Two rounds questionnaires	8 questionnaires: 7 open ended questionnaires	Second round a revised assessment form	Round 1 response 83% Round 2 response 72%

Appendix 2 Interview guideline

Appendix 2.1 for Nurse and Educator

Introduction

This guideline is used for the research entitled 'Nursing Practice Guideline for foot care for diabetic patients in Thailand', which aims to explore current and best practice for foot care service in diabetic patients in Thailand to identify core component for foot care

Duration

This interview should last from 60 to 90 minutes.

Environment

The interview should be conducted in a place where privacy and confidentiality are protected.

Participants

1. Thai nurses who work with diabetic patients or in diabetic clinics
2. Educators who work or teach students in diabetic patients.

Process of interview

1. Arriving early at the interview site
2. Setting up equipment such as table, chair, paper, pen, audio recorder, etc.
3. Testing the record equipment
4. When the participant arrive, greeting with friendly manner and establishing a rapport
5. Obtaining an informed consent
6. Briefly informing the steps of interview process
7. Turning on audio recorder
8. Ask about personal information related to the research aims, such as age, education, and work experience about diabetic foot care, role and responsibility.
9. Conducting interview, regarding the interview schedule
10. End the phase of question-asking
11. Giving participant opportunity to ask some questions
12. Turing off audio recorder
13. Thank the participant
14. Refreshment
15. Clarifying some factual errors expressed during the interview

Interview Schedule

These questions and probes are used to explore the participants' experience about foot care in diabetic patients in relation to theory of self-efficacy. This semi structure

interview will attempt to elicit information from the nurses in the clinic and the educators in the school of nursing on current foot care practice and the use of a nursing practice guideline. With a semi structured interview, the interviewer is allowed to change the words in each question or to use sub-questions for facilitating the interviewee to express as much as possible. However, main content of each question must be maintained. To achieve the research purposes, the questions listed in this schedule must be addressed. The 2 scenarios will be interviewed participants in order to elicit nurse's knowledge and skills

During interview, any comments presented by non-verbal communication, or any problems found from each question should be noted in a field note attached with this interview schedule.

Question	Purpose	Sub-question
1. How often do you see patients who are diabetic and also have foot problem?	Ask experience of foot care practice	
2. What kind of foot problems do patients present with? (Foot ulcer, neuropathy, numbness, no sensation, Charcot)	Ask experience of foot care practice	
3. For patients who have foot ulcers and neuropathy what do you do?	Explore the current practice and knowledge of foot care	
4. For patients who have foot ulcers and no neuropathy what do you do?	Explore the current practice and knowledge of foot care	
5. For patients who have neuropathy and no foot ulcers what do you do?	Explore the current practice and knowledge of foot care	
6. Are you concerned when you see a patient with neuropathy and foot ulcer?	Explore the attitude of foot care practice and understanding	
7. How do you screen for diabetic neuropathy?	Explore knowledge and practice of foot care	
8. How often do you screen the diabetic patient with and without neuropathy?	Explore the current practice of foot care	
9. Do you use a structured screening approach to manage the patients?	Explore the current practice and existing guideline	
10. What form does this structured approach take?	Explore the current practice	
11. What advice do you give them?	Explore the current practice	
12. What do you teach about daily foot care?	Explore the current practice	
13. Do you think patients can manage foot examination daily?	Explore attitude and knowledge of foot care practice	

14. What current foot care guidelines do you use?	Explore the current practice	
15. Does the current guideline work? Why?	Explore the current practice	

Scenarios 1	Concept
A Thai old woman of 64 years has had Type 2 diabetes for 20 years. She has not managed her diet and blood glucose control for the last 10 years. As she became aware of numbness of her feet, she started to control diet. She ate only half cup of rice per meal and avoided the sugar in her food. Sometimes she bought instant food although she knew it was not good and instant food have monosodium glutamate. She attends the diabetes clinic for annual review and has no other foot problems. On the routine visit to the clinic, she complains of numbness in both feet.	Care of poor glycaemia control

Question	Purpose	Sub-question
1. How would you manage this case?	Explore the current practice	
2. What advice would you give her?	Explore the current practice and knowledge	

Scenarios 2	Concept
A Thai adult man of 50 years has had Type 2 diabetes for 15 years. He has not managed his diet and blood sugar control since diagnosis. He attends the diabetic clinic for annual review. On close inspection of his foot there is callus and a small ulcer under the second metatarsal head. His foot hygiene is poor. Actually, he never walks barefoot but mostly he wears a pairs of slipper which is not waterproof. He also ventures outside so that his feet get wet.	Case management for diabetic foot ulcer

Question	Purpose	Sub-question
1. How would you manage this case?	Explore the current practice	
2. What advice would you give her?	Explore the current practice and knowledge	

Appendix 2.2 Interview guideline for diabetic patients

Introduction

This guideline is used for the research entitled '**Nursing Practice Guideline for foot care for diabetic patients in Thailand', which aims to** explore current and best practice for foot care service in diabetic patients in Thailand to identify core component for foot care

Duration

This interview should last from 60 to 90 minutes.

Environment

The interview should be conducted in a place where privacy and confidentiality are protected.

Participants

Diabetic Patients who have had foot ulcer or neuropathy

Process of interview

1. Arriving early at the interview site
2. Setting up equipment such as table, chair, paper, pen, audio recorder, etc.
3. Testing the record equipment
4. When the participant arrive, greeting with friendly manner and establishing a rapport
5. Obtaining an informed consent
6. Briefly informing the steps of interview process
7. Turning on audio recorder
8. Greeting and give researcher in formations related to the research aims
9. Conducting interview, regarding the interview schedule
10. End the phase of question-asking
11. Giving participant opportunity to ask some questions
12. Turing off audio recorder
13. Thank the participant
14. Refreshment
15. Clarifying some factual errors expressed during the interview

Interview Schedule

These questions and probes are used to explore the participants' experience about foot care in diabetic patients in relation to theory of self-efficacy. The semi structure interview aims to elicit from patients what advice they have received regarding foot care and whether they are following the advice. With a semi structured interview, the interviewer is allowed to change the words in each question or to use sub-questions for facilitating the interviewee to express as much as possible. However, main content of

each question must be maintained. To achieve the research purposes, the questions listed in this schedule must be addressed.

During interview, any comments presented by non-verbal communication, or any problems found from each question should be noted in a field note attached with this interview schedule.

Question	Purpose	Sub-question
1. How long have you had diabetes?	Explore knowledge	
2. Have you noticed any changes to your feet because of you diabetes?	Explore knowledge	
3. Did you understand the problem? And do you know your complication?	Explore knowledge	
4. What information did the nurse/doctor give you about your diabetes? For example: foot care, Blood screening,	Explore the current foot care education and perception of foot care service	
5. Have you developed any complications? For example neuropathy	Explore the knowledge	
6. How do you care for your body and your feet?	Explore the current foot care practice	
7. Who else at home understands about your illness? Do they help?	Explore the current foot care practice	
8. Do you have any problem with your feet?	Explore knowledge	
9. Do you understand what diabetes is?	Explore knowledge	

Interviews Schedule with field note (Nurse/Educator))

Research Title: Nursing Practice Guideline for Foot Care for Patients with Diabetes In Thailand
Interview number:_____ Site: _____ **Interviewer: _____ Date: _____** **Time Start: _____ End:_____**
Question 1: How often do you see patients who are diabetic and have foot problem? ท่านพบผู้ป่วยเบาหวานที่มีปัญหาที่เท้าบ่อยหรือไม่ เพียงใด
Question 2: What kind of foot problems do patients present with? (Foot ulcer, neuropathy, numbness, no sensation, Charcot) ปัญหาที่เท้าที่พบบ่อยของผู้ป่วยเบาหวาน ที่ท่านพบมีอะไรบ้าง (แผลที่เท้า อาการชา ไม่มีความรู้สึก ปัญหาตาปลา)
Question 3: For patients who have foot ulcers and neuropathy what do you do? ท่านให้การดูแลและคำแนะนำผู้ป่วยที่มีปัญหาแผลที่เท้าและปลายประสาทเท้าเสื่อมอย่างไร
Question 4: For patients who have foot ulcers and no neuropathy what do you do? ท่านให้การดูแลและคำแนะนำผู้ป่วยที่มีแผลที่เท้า แต่ไม่มีอาการปลายประสาทเท้าเสื่อมอย่างไร
Question 5: For patients who have neuropathy and no foot ulcers what do you do? ท่านให้การดูแลและคำแนะนำผู้ป่วยที่มีปลายประสาทเท้าเสื่อม แต่ไม่มีแผลที่เท้าอย่างไร
Question 6: Are you concerned when you see a patient with neuropathy and foot ulcer? ท่านตระหนักถึงปัญหาแผลที่เท้าในผู้ป่วยที่มีปลายประสาทเท้าเสื่อมหรือไม่ อย่างไร
Question 7: How do you screen for diabetic neuropathy? ท่านประเมินภาวะปลายประสาทเสื่อมในผู้ป่วยเบาหวานอย่างไร
Question 8: How often do you screen the diabetic patient with and without neuropathy? ท่านมีโอกาสประเมินผู้ป่วยเบาหวานที่มีภาวะปลายประสาทเสื่อมกับไม่มีภาวะปลายประสาทเสื่อมบ่อยเพียงใด
Question 9: Do you use a structured screening approach to manage the patients? มีแบบประเมินคัดกรองที่นำไปสู่การจัดการผู้ป่วยหรือไม่อย่างไร ท่านใช้แบบฟอร์มในการประเมินภาวะปลายประสาทเสื่อมเพื่อการจัดการดูแลผู้ป่วยหรือไม่อย่างไร
Question 10: What form does this structured approach take? แบบฟอร์มที่ท่านใช้ประเมินนั้น ประเมินอะไรบ้าง อย่างไร
Question 11: What advice do you give them? ท่านให้คำแนะนำอะไรบ้าง เมื่อพบว่าการประเมินนั้นมีปัญหา
Question 12: What do you teach about daily foot care? การดูแลเท้าประจำวันต้องแนะนำอะไรบ้าง
Question 13. Do you think patients can manage foot examination daily? ที่ผ่านมา ผู้ป่วยสามารถดูแลประเมินเท้าตนเองได้หรือไม่ อย่างไร
Question 14. What current foot care guidelines do you use? ท่านใช้แนวทางการปฏิบัติการดูแลเท้าหรือไม่ แนวปฏิบัติที่ท่านใช้อยู่เป็นอย่างไร
Question 15. Does the current guideline work? Why? แนวทางการปฏิบัติการดูแลเท้าที่ใช้อยู่ในปัจจุบัน ได้ผลหรือไม่ อย่างไร

Scenario 1

A Thai old woman of 64 years has had Type 2 diabetes for 20 years. She has not managed her diet and blood glucose control for the last 10 years. As she became aware of numbness of her feet, she started to control diet. She ate only half cup of rice per meal and avoided the sugar in her food. Sometimes she bought instant food although she knew it was not good and instant food have monosodium glutamate. She attends the diabetes clinic for annual review and has no other foot problems. On the routine visit to the clinic she complains of numbness in both feet.

กรณีศึกษาที่ 1

หญิงไทยอายุ 64 ปี เป็นเบาหวานชนิดที่ 2 มานาน 20 ปี ผู้ป่วยไม่เคยคุมอาหารและระดับน้ำตาลในกระแสเลือดมาเป็นเวลา 10 ปี เมื่อเริ่มมีอาการชาบริเวณปลายเท้า ผู้ป่วยเริ่มควบคุมอาหารโดยการกินข้าวมือละครึ่งถ้วย และ เลี่ยงการใส่น้ำตาลในอาหาร บางครั้ง กินอาหารสำเร็จรูป ทั้งๆ ที่รู้ว่าไม่ดีและมีผงชูรส ผู้ป่วยเข้ารับการตรวจในคลินิกเบาหวานเป็นประจำและรับการตรวจประเมินเท้าประจำทุกปี และไม่มีปัญหาแผลที่เท้า ขณะที่เข้ารับการตรวจประเมินเท้าผู้ป่วยบ่นเกี่ยวกับอาการชาที่เท้าทั้งสองข้างเสมอ

Question1 How would you manage this case?

ท่านจะจัดการดูแลผู้ป่วยรายนี้อย่างไร

Question 2 What advice would you give her?

ท่านจะให้คำแนะนำอะไรให้กับผู้ป่วยรายนี้บ้าง

Scenario 2

A Thai adult man of 50 years has had Type 2 diabetes for 15 years. He has not managed his diet and blood sugar control since diagnosis. He attends the diabetic clinic for annual review. On close inspection of his foot there is callus and a small ulcer under the second metatarsal head. His foot hygiene is poor. Actually, he never walks barefoot but mostly he wears a pairs of slipper which is not waterproof. He also ventures outside so that his feet get wet.

กรณีศึกษาที่ 2

ชายไทยอายุ 50 ปี เป็นเบาหวานมานาน 15 ปี ไม่เคยควบคุมอาหารและควบคุมระดับน้ำตาลในเลือดได้เลย ผู้ป่วยเข้ารับการตรวจในคลินิกเบาหวานเป็นประจำ และได้รับการตรวจเท้าเป็นประจำทุกปี จากการประเมินเท้าผู้ป่วยมีตาปลาและแผลขนาดเล็กบริเวณ second metatarsal head สภาพเท้าสกปรก ผู้ป่วยชอบสวมรองเท้าแบบหูหีบ แต่ไม่เคยถอดรองเท้าเดิน

Question1 How would you manage this case?

ท่านจะจัดการดูแลผู้ป่วยรายนี้อย่างไร

Question 2 What advice would you give her?

ท่านจะให้คำแนะนำอะไรให้กับผู้ป่วยรายนี้บ้าง

Interviews Schedule with field note (Patients)

Research Title: Nursing Practice Guideline for Foot Care for Patients with Diabetes In Thailand
Interview number: _____Site: _____ **Interviewer: _____Date: _____** **Time Start: _____ End:_____**
Question 1: How long have you had diabetes? ท่านเป็นเบาหวานมานานกี่ปี
Question 2: Do you understand what diabetes is? โรคเบาหวานที่ท่านเป็นคืออะไร ท่านเข้าใจว่าโรคเบาหวานคือโรคอะไร เกิดจากอะไร
Question 3: Did you understand the problem? And do you know your complication? ท่านรู้หรือไม่ว่า เบาหวานทำให้เกิดปัญหาแทรกซ้อนอื่นๆ ได้ และท่านหรือไม่ว่าสามารถป้องกันได้ โรคเบาหวานทำให้เกิดโรคแทรกซ้อนอะไรบ้าง สามารถป้องกันได้หรือไม่
Question 4: Have you developed any complications? For example neuropathy ท่านคิดว่า ตัวท่านเองมีโรคแทรกซ้อนเกิดขึ้นหรือไม่ ถ้ามี มีอาการอะไรบ้าง
Question 5: Have you noticed any changes to your feet as a consequence of you diabetes? ท่านเคยสังเกตว่ามีการเปลี่ยนแปลงของเท้าจากโรคเบาหวานหรือไม่
Question 6: Do you have any problem with your feet? ท่านมีปัญหาเกี่ยวกับเท้าหรือไม่ อย่างไร มีปัญหาของเท้า อย่างไร มีอาการผิดปกติ ที่เกี่ยวกับเท้าอย่างไรบ้าง
Question 7: What information did the nurse/doctor give you about your diabetes? For example foot care, Blood screening พยาบาลและแพทย์ ให้ข้อมูลเกี่ยวกับโรคเบาหวานเกี่ยวกับ การดูแลเท้า การตรวจเลือด การรับประทานยา/การฉีดยา อย่างไรบ้าง (การดูแลเท้า , การตรวจเลือด, การรับประทานยา การฉีดยา, การรับประทานอาหาร)
Question 8**:** How do you care for your body and your feet? ท่านดูแลร่างกายและดูแลเท้าอย่างไร
Question 9: Who else at home understands about your illness? Do they help? ในครอบครัวท่าน ใครที่เข้าใจในโรคที่ท่านเป็น และช่วยเหลือดูแลท่านหรือไม่ อย่างไร

Appendix 3 Panel expert

Name list of panel experts for the Delphi technique

Name	Position & Work place	Experience
1.Associated Dr.Siriporn Janchai	M.D. in Physical Medical and Rehabilitation, Department of rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand	- Rehabilitation doctor in diabetic foot clinic in 2004 - present -Certification of research fellow in physical Medicine and Rehabilitations Louisiana State University, USA -Certification of diabetes foot program LSU HSC, Baton Rouge, USA **-Research** -JANCHAI, S. & TANTISIRIWAT, N. (2005) Reliability of foot caliper. *J Med Assoc Thai,* 88 Suppl 4**,** S85-9. - Tantisiriwat, N and Janchai, S.(2006) Mismated feet in diabetes. *Chula Med J*; 50(8): pp.531-40 - JANCHAI, S 2006. Off-loading Technique to Heal Diabetes Mellitus. Foot Ulcer *Update of Wound care and Wound healing* (In Thai Publishing) Bangkok, Wound Healing Thai Association. -Tantisiriwat, N and Janchai, S. (2008) Common Foot Problems in Diabetic foot Clinic. *J Med Assoc Thai,* 91 (7)**,** pp.1097-1101.
2.Dr.Vitayut Namsiripongpun	M.D. in Endocrine, Department of Medicine of Prapokkla Hospital, Chantaburi, Thailand	M.D. in Endocrine clinic, Diabetic clinic at Prapokkloa Hospital in 1985-present
3.Dr.Apirak Pisutaporn	M.D. at Makham Hospital (Secondary care) Director of Makham Hospital, Chantaburi, Thailand	M.D. in General Practice in Diabetic clinic at Secondary Care(Makham Hospital) in 1991-present **Research**: -Pisutaporn, A et al. (2008). Participation in Self-control blood sugar and behaviour change in diabetic patients. *Journal Prapokkloa Hospital Clinical Medicine Education Centre,* 25 (Supp 2), pp. 268s-273s

Name	Position & Work place	Experience
4.Dr. Waraporn Polamaung	M.D. in Endocrine, Department of Medicine of Prapokklao Hospital Chantaburi, Thailand	-M.D in diabetic clinic at Prapokkloa Hospital 1995- present **Research**: Polamaung,W (2008). Evaluating of learning in diabetes mellitus. *Journal Prapokkloa Hospital Clinical Medicine Education Centre*, 25 (Supp 2), pp. 13s-21s.
5.Assosiated Professessor Dr Tipaporn Tarawanich	M.D. in Endocrine, Tummasart Salerm Prakerd Hospital	-M.D. in Endocrine clinic at Diabetic clinic Thummasart Salermprakerd Hospital, Faculty of medical science, Thummasat University, in 1998-present
6.Dr. Nukoon Kunakidchaichod	General Surgery Medicine	-M.D. in Nephrology at Police General Hospital, Thailand at surgical clinical and Nephrology clinic 2002- present
7.Mr. Somkiet Maha-Udomporn	-B.Sc in Physiotherapy. -The Raj-pracha-samasai *Institute* for *Leprosy*. Research and Training in Thailand, Samutprakarn, Thaialnd 10130	-Physiotherapist in neuropathy clinic at The Raj-Rracha-Samasai *Institute* for *Leprosy* in 1985-present -Lecturer in Topic “Diabetes Neuropathic foot management “and off –loading in diabetic foot care and wound care curriculum of Thai Association of Diabetes Educators.
8.Mr.Thiti Prab Na Sak	B.Sc in Physiotherapy. Physiotherapist. -Consultant in diabetes foot care team	-Worked in Neuropathy foot care clinic in The Raj-Pracha-Samasai *Institute* for *Leprosy*. Research and Training in Thailand, Samutprakarn, Thailand since 2003- 2008 -Lecturer in Topic “foot care assessment”, expert mentorship in diabetic foot care and wound care curriculum of Thai Association of Diabetes Educators.
9 Jeeraphan Sripatpong	B.Sc in Physiology	-Worked in foot care clinic in Theptarin Hospital since 2003-present -Lecturer in Topic ‘Foot care management’ -Expert mentorship in diabetic and wound care curriculum of Thai Association of Diabetes Educators.

Name	Position & Work place	Experience
10.Associate Professor Dr Pratum Soivong	RN, MA Nursing Medical Surgical Nursing, Faculty of nursing, Chiang Mai University, Chaing Mai	-Nurse Instructor of Medicine Nursing since 1990-present -Lecturer in Concept related to the chronic illness and nursing care for adults with chronic illness and family -Co-Research in Research of diabetic issue **Research** Wonghongkul,T, Acadejanun,T and Soivong,P(1993) Relationship between basic factor, social support and self-care ability with quality of life in diabetic patients (In Thai Language). Nursing Journal. 26(2), pp. 13-23.
11. Dr Chodchoi Watana	B Sc (Nursing and Midwifery) M S (Nursing), PhD. In Nursing Nurse Instructor in Adult and Elderly Department, Faculty of nursing science, Thummasart University	-Head of project of Self-management in Uncontrolled Diabetic Patients (Research Project) in 2003 -Nurse Instructor in Faculty of nursing science, Thummasart since 2001 - Present **Research** -Wattana, C (2007). Effects of a Diabetes Self-management Program on Glycaemic Control, Coronary Heart Disease Risk, and Quality of Life Among Thai People with Type 2 Diabetes. *Nursing and Health Science Journal*, 9 (2), pp. 135-141.
12.Bumned Sangrat	B.Sc. nursing MNS in Adult Nursing in Maharaij Hospital	-APN diabetes and foot care of Maharaj Hospital -Practice Nurse worked in Foot clinic of Maharaj Hospital, Chieng Mai in 2005-present **Research** -Sangrat, B (2520) Effect of Fawn Jerng Mor Chor exercise on glycosylated haemoglobin level among elders with type 2 diabetes mellitus
13.Sirirat Luaunsom-napa	B.Sc. nursing MNS in Adult Nursing	-Certificated in diabetic foot care in Thai diabetes Association in 2005 -Practice Nurse worked in primary care unit, Diabetic clinic, Borai Hospital, Trat Province in 2002- present
14.Jaruwan Rattanamongkon	B.Sc in nursing, MNS in nursing	-Practice Nurse worked in Foot clinic of Maung Hospital ,Chacheangchao Province in 1998-present -Certificated in diabetic foot care in Thai diabetes Association in 2005

Name	Position & Work place	Experience
15.Janchai Takoondee	B.Sc in nursing, MNS in nursing	-Advanced Practice Nurse worked in Foot clinic of Banpong Hospital, Ratchaburi Province since 2003- present -Certificated in diabetic foot care in Thai diabetes Association in 2005
16.Sumalee Cheaupan	B.Sc in nursing, MNS in nursing Nurse Practioner at Bang Ra Mung Hospital (Secondary care), Chonburi Province, Thailand	-Practice Nurse worked in Foot clinic of Bang Ra Mung Hospital (Secondary care), Chonburi Province, Thailand in **Research**: -Cheaupan,S (2007)Factors influencing foot care behaviours in patients with type II diabetes Theses in Master Degree Burapa University. -Certificated in diabetic foot care in Thai diabetes Association in 2005
17.Ms Pitchwara Punpitpat	*B.Sc in nursing, MNS in nursing Case manager in diabetic clinic*	-Diabetic Case Manager Practice Nurse in Thammasatchaloemprakiat Hospital , Phatumtani Province in 1989-present--Certificated in diabetic foot care in Thai diabetes Association in 2005
18.Vitchuda Phunnotok	B.Sc in nursing,	-Practice nurse in diabetic foot clinic in Bangprkong hospital, Chonburi province in 1995- present -Certificated in diabetic foot care in Thai diabetes Association in 2005
19.Supaporn Taweehun	B.Sc in Nursing *MNS in Adult Nursing*	-Register Nurse in Diabetic clinicDepartment Thunyaburi,Hospital, Pratumtanee province, Thailand in 1998- present -Certificated in diabetic foot care in Thai diabetes Association in 2005
20.Aunchalee Meesana	B.Sc in Nursing, MNS in Adult nursing	-Practice Nurse in Diabetic clinic in Thunyaburi,Hospital, Pratumtanee province, Thailand in 1998- present -Certificated in diabetic foot care in Thai diabetes Association in 2005

*All panels agreed with participant in the Delphi Technique

Appendix 4 Ethical approval

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September 4, 2008

Phra-Pok-Kloa Hospital, Chantaburi
36 Leabneoun Street, Watmai District
Amphur Muang,
Chantaburi Province 22000
THAILAND

Dear Director of Prapokklao Hospital

RE: PhD Study at De Montfort University, Leicester, United Kingdom

I am currently being sponsored by the Thai Government/ Prapokkloa Nursing College, Chantaburi province to study for my PhD at De Montfort University. I am investigating foot care guideline in diabetic patients in Thailand.

As a requirement of the PhD registration, I need to provide a letter from the hospital indicating that it will allow the researcher access to collect the data. I have selected Prapokkloa Hospital because this hospital provides preventative and curative foot care for diabetic patients in Chantaburi and is suitable for the research being undertaken.

I would very much appreciate an early response and thank you for your help. Please do not hesitate to contact me or my supervisor if you require further information.

Yours Sincerely,

T. Namwong

Tassamon Namwong

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Letter for ethical Approval for hospital in Thai language

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4 กันยายน 2551

เรื่อง ขอความอนุเคราะห์ในการทดลองแบบสัมภาษณ์ และเก็บข้อมูลเพื่อการวิจัย

เรียน ผู้อำนวยการโรงพยาบาลพระปกเกล้า จันทบุรี

สิ่งที่แนบมาด้วย 1. โครงร่างวิจัยฉบับย่อ (ภาษาไทย) แนบเครื่องมือในการวิจัยและ แบบพิทักษ์สิทธิกลุ่มตัวอย่าง
2. โครงร่างวิจัยฉบับย่อ (ภาษาอังกฤษ)
3.เอกสาร Ethic Approval จากมหาวิทยาลัย
4.เอกสารร่างอนุมัติการเก็บข้อมูล (ภาษาอังกฤษ)

เนื่องด้วยดิฉัน นางสาวธัสมน นามวงษ์ อาจารย์พยาบาล วิทยาลัยพยาบาลพระปกเกล้า จันทบุรี ขณะนี้ได้รับทุน กพ.จากสถาบันพระบรมราชชนก กระทรวงสาธารณสุข มาศึกษาในระดับปริญญาเอก สาขาการพยาบาลผู้สูงอายุ มหาวิทยาลัยเดอมองฟอร์ด ประเทศอังกฤษ De Montfort University

ขณะนี้ที่มหาวิทยาลัยได้อนุมัติโครงร่างวิจัยเรื่อง แนวปฏิบัติการพยาบาลในการดูแลเท้าสำหรับผู้ป่วยเบาหวานในประเทศไทย (Nursing Practice Guideline for foot care for diabetic patients in Thailand) และได้ผ่านคณะกรรมการพิจารณาจริยธรรมของมหาวิทยาลัยเป็นที่เรียบร้อยแล้ว ผู้วิจัยได้ออกแบบงานวิจัยโดยการสัมภาษณ์ข้อมูลการดูแลเท้าในผู้ป่วยเบาหวานและพยาบาลวิชาชีพที่ให้บริการกับผู้ป่วยเบาหวานในคลินิกเบาหวานหรือหอผู้ป่วยศัลยกรรม ดังนั้นเพื่อให้ได้ข้อมูลและนำมาพัฒนาแนวปฏิบัติการพยาบาลในการดูแลเท้า จึงมีความจำเป็นที่ขอความอนุเคราะห์ในการเก็บข้อมูลและทดลองใช้เครื่องมือสัมภาษณ์ในโรงพยาบาลพระปกเกล้า จันทบุรี โดยมีกลุ่มตัวอย่างคือ ผู้ป่วยเบาหวาน จำนวน 15 คนและ พยาบาลวิชาชีพที่เกี่ยวข้องกับการดูแลเท้าในผู้ป่วยเบาหวาน จำนวน 10 คน ในช่วงเวลาระหว่างเดือน มกราคม – มีนาคม 2552 เนื่องจากเป็นโรงพยาบาลขนาดใหญ่ที่ให้บริการตั้งแต่ในด้านการป้องกัน ส่งเสริม รักษาผู้ป่วยเบาหวานที่มีแผลที่เท้าในจังหวัดจันทบุรี ซึ่งมีประโยชน์และครอบคลุมขอบเขตของงานวิจัย

จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์ ในการเก็บรวบรวมข้อมูลครั้งนี้ด้วย จักเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

ธัสมน นามวงษ์

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4 กันยายน 2551

เรื่อง ขอความอนุเคราะห์ในการทดลองแบบสัมภาษณ์ และเก็บข้อมูลเพื่อการวิจัย

เรียน ผู้อำนวยการ โรงพยาบาลพระปกเกล้า จันทบุรี

สิ่งที่แนบมาด้วย 1.โครงร่างวิจัยฉบับย่อ (ภาษาไทย) แนบเครื่องมือในการวิจัยและ แบบพิทักษ์สิทธิกลุ่มตัวอย่าง
2.โครงร่างวิจัยฉบับย่อ (ภาษาอังกฤษ)
3.เอกสาร Ethic Approval จากมหาวิทยาลัย
4.เอกสารร่างอนุมัติการเก็บข้อมูล (ภาษาอังกฤษ)

เนื่องด้วยดิฉัน นางสาวรัสมน นามวงษ์ อาจารย์พยาบาล วิทยาลัยพยาบาลพระปกเกล้า จันทบุรี ขณะนี้ได้รับทุน กพ.จากสถาบันพระบรมราชชนก กระทรวงสาธารณสุข มาศึกษาในระดับปริญญาเอก สาขาการพยาบาลผู้สูงอายุ มหาวิทยาลัยเดอมองฟอร์ต ประเทศอังกฤษ De Montfort University

ขณะนี้ที่มหาวิทยาลัยได้อนุมัติโครงร่างวิจัยเรื่อง แนวปฏิบัติการพยาบาลในการดูแลเท้าสำหรับผู้ป่วยเบาหวานในประเทศไทย (Nursing Practice Guideline for foot care for diabetic patients in Thailand) และได้ผ่านคณะกรรมการพิจารณาจริยธรรมของมหาวิทยาลัยเป็นที่เรียบร้อยแล้ว ผู้วิจัยได้ออกแบบงานวิจัยโดยการสัมภาษณ์ข้อมูลการดูแลเท้าในผู้ป่วยเบาหวานและพยาบาลวิชาชีพที่ให้บริการกับผู้ป่วยเบาหวานในคลินิกเบาหวานหรือหอผู้ป่วยศัลยกรรม ดังนั้นเพื่อให้ได้ข้อมูลและนำมาพัฒนาแนวปฏิบัติการพยาบาลในการดูแลเท้า จึงมีความจำเป็นที่ขอความอนุเคราะห์ในการเก็บข้อมูลและทดลองใช้เครื่องมือสัมภาษณ์ในโรงพยาบาลพระปกเกล้า จันทบุรี โดยมีกลุ่มตัวอย่างคือ ผู้ป่วยเบาหวาน จำนวน 15 คนและ พยาบาลวิชาชีพที่เกี่ยวข้องกับการดูแลเท้าในผู้ป่วยเบาหวาน จำนวน 10 คน ในช่วงเวลาระหว่างเดือน มกราคม – มีนาคม 2552 เนื่องจากเป็นโรงพยาบาลขนาดใหญ่ที่ให้บริการตั้งแต่ในด้านการป้องกัน ส่งเสริม รักษาผู้ป่วยเบาหวานที่มีแผลที่เท้าในจังหวัดจันทบุรี ซึ่งมีประโยชน์และครอบคลุมขอบเขตของงานวิจัย

จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์ ในการเก็บรวบรวมข้อมูลครั้งนี้ด้วย จักเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

รัสมน นามวงษ์

(นางสาวรัสมน นามวงษ์)
PhD. Candidated
De Montfort University, United Kingdom

Faculty of Health and Life Sciences, Charles Fears Campus, 226 London Road, Leicester LE2 1RQ.

Ethic Approval from Phrapokklao Hospital

Prapokklao Hospital, Chantaburi

Ministry of Public Health, THAILAND

To whom it may concern

This is to certify that the researcher (Tassamon Namwong) has contacted and asked for collaborating establishment to collect data for her research on Nursing practice guideline for foot care for diabetic patients in Thailand. This study has been approved and permission given to collect the study data from this hospital.

For further query please do not hesitate to contact us.

Name.....Daorink Sinthuvanich..... Date.....30 October 2008.....

(Dr. Daorink Sinthuvanich)

Director of Prapokklao Hospital

Leabneoun Street, Watmai District, Muang, Chantaburi 22000

Tel. (66)39 301353-58

Ethic Approval from Phrapokklao Nursing College

Phra-Pok-Klao Nursing College, Chantaburi

Praboromrajachok Institute, Ministry of Public Health, THAILAND

To whom it may concern

This is to certify that the researcher (Tassamon Namwong) has contacted and asked for collaborating establishment to collect data for her research on Nursing practice guideline for foot care for diabetic patients in Thailand. This study has been approved and permission given to collect the study data from this college.

For further query please do not hesitate to contact us.

Name.....Pinnarate Gadudom..... Date...May 7, 2008

(Mr. Pinnarate Gadudom)

On Behalf of the Director of Phra-Pok-Klao Nursing College

Email: pinnarate@hotmail.com

36 Leabneoun Street, Watmai District, Maung, Chantaburi 22000 THAILAND
Tel. (66)393 11188 Fax. (66)393 30080

Ethic Approval from De Montfort University

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23rd April 2008

Tassamon Namwong
PhD Candidate
Health & Life Sciences

Dear Tassamon,

Re: Ethics application – Nursing practice guidelines for foot care for patients with diabetes in Thailand (ref: 317)

I am writing regarding your application for ethical approval for a research project titled to the above project. This project has been reviewed in accordance with the Operational Procedures for De Montfort University Faculty of Health and Life Sciences Research Ethics Committee. These procedures are available from the Faculty Research and Commercial Office upon your request.

I am pleased to inform you that ethical approval has been granted by Chair's Action for your application. This will be reported at the next Faculty Research Committee, which is being held on 26th June 2008.

Should there be any amendments to the research methods or persons involved with this project you must notify the Chair of the Faculty Research Ethics Committee immediately in writing. Serious or adverse events related to the conduct of the study need to be reported immediately to your Supervisor and the Chair of this Committee. Also, The Faculty Research Ethics Committee should be notified by e-mail to HLSFRO@dmu.ac.uk when your research project has been completed.

Yours sincerely,

Professor Paul Whiting
Chair
Faculty of Health and Life Sciences
Research Ethics Committee

Faculty of Health and Life Sciences, The Gateway, Leicester LE1 9BH.
Tel: (0116) 255 1551 / **Fax:** (0116) 257 7135

Appendix 5 Consent form of patients, nurse, educator

Consent form
Version1:11 March 2008

Appendix 4

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CONSENT FORM

Title of Project: Nursing practice guidelines for foot care for patients with diabetes in Thailand

Name of Researcher: Tassamon Namwong

Please initial box

1. I confirm that I have read and understand the information sheet dated ..... for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that relevant sections of any of data collected during the study, may be looked at by responsible individuals from the DMU research committee from regulatory authorities or from the director of Phra-Pok-Klao Nursing College, Ministry of the Public Health in Thailand , where it is relevant to my taking part in this research. I give permission for these individuals to have access this data for monitoring purposes. ☐

4. I agree to take part in the above study. ☐

Name of Patient	Date	Signature
Name of Person taking consent (if different from researcher)	Date	Signature
Researcher	Date	Signature

CONSENT TO PHOTOGRAPHY

For Educational Use

Clinical photographs play a key role in the education of health care staff at all levels and thus benefit future patients.

I understand that the illustrations requested here may be used for purposes of medical and nursing teaching, research. In view of the explanation given to me, I agree that the illustrations may be used for publication in a journal, textbook or as part of a display.

This form gives my consent to be photographed. I understand that if I do not wish to be photographed it will not affect my treatment or medical care. I confirm that it has been explained to me in terms I have understood how the material could be used.

I understand that no fee is payable to me in respect of the material either now or in the future.

TO BE COMPLETED BY PATIENT OR GUARDIAN

- I consent for the material to be part of my medical records and used for teaching, presentation at conferences or made available in publications.

Signature: …….Patient/Guardian

Print Name: …… Date……..

Researcher:..... Date.....

Print Name:.....

Recording: **Digital photographs**

If you decide to withdraw consent at a later date, it is possible that illustrations may already be in the public domain.

Consent form in Thai version

Consent form
Version1:11 March 2008

ใบยินยอมเข้าร่วมโครงการวิจัยในมนุษย์
เรื่องการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวานในไทย

ชื่อผู้วิจัย : ธัสมน นามวงษ์

ก่อนเข้าร่วมโครงการวิจัยนี้

1.ข้าพเจ้ายอมรับว่าข้าพเจ้าได้รับทราบข้อมูลของการศึกษาวิจัยนี้ในวันที่..... ☐
ข้าพเจ้าได้รับโอกาสในการสอบถามข้อมูล พิจารณาข้อมูล และตอบคำถามที่ข้าพเจ้าสงสัยจนกว่าจะพอใจ

2.ข้าพเจ้าเข้าใจว่าการมีส่วนในงานวิจัยนี้เป็นไปด้วยความสมัครใจ และข้าพเจ้ามีสิทธิ์ที่จะบอกเลิกการเข้าร่วม ☐
โครงการนี้เมื่อใดก็ได้ โดยจะไม่มีผลกระทบต่อการได้รับบริการหรือการรักษาที่ข้าพเจ้าหรือผู้เกี่ยวข้องมีสิทธิ์ได้รับ
แต่ประการใด

3.ข้าพเจ้าเข้าใจว่าข้อมูลที่ได้จากการศึกษาครั้งนี้จะเก็บเป็นความลับ และเปิดเผยได้เฉพาะในรูปที่สรุปผลของวิจัย ☐
การเปิดเผยข้อมูลที่เกี่ยวกับการศึกษาครั้งนี้ต่อมหาลัยและโรงพยาบาลที่เกี่ยวข้อง กระทำด้วยกรณีจำเป็นด้วยเหตุผล
ทางวิชาการเท่านั้น

4.ข้าพเจ้าตกลงที่จะเป็นส่วนร่วมของการศึกษาครั้งนี้ มีความเข้าใจดีทุกประการ ☐
ได้ลงนามในใบยินยอมด้วยความสมัครใจ

ชื่อผู้ป่วย/พยาบาล	วันที่	ลายเซนต์
พยาน	วันที่	ลายเซนต์
ผู้วิจัย นางสาวธัสมน นามวงษ์	วันที่	ลายเซนต์

Consent form for photography in Thai version

Consent form
Version1:11 March 2008

ใบยินยอมให้ถ่ายภาพเพื่อการศึกษา

โครงการวิจัย เรื่องการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวานในไทย

ชื่อผู้วิจัย : ธัสมน นามวงษ์

ก่อนเข้าร่วมโครงการวิจัยนี้

ข้าพเจ้าได้รับทราบข้อมูลของการศึกษาวิจัยนี้ว่า

รูปภาพทางคลินิกมีบทบาทสำคัญต่อการศึกษาทางการแพทย์ และมีประโยชน์ต่อผู้ป่วยในอนาคต และข้าพเจ้าเข้าใจว่า การให้ถ่ายภาพทางการแพทย์นี้จะใช้เพื่อการศึกษาวิจัยทางการแพทย์และพยาบาล และอาจารย์ผู้ควบคุมและตรวจงานวิจัยเท่านั้น และ ยอมรับว่า ภาพถ่ายทางการแพทย์นี้อาจใช้ในการตีพิมพ์ลงในงวารสาร หรือ หนังสือทางการแพทย์ หรือส่วนหนึ่งของวิทยานิพนธ์นี้

แบบฟอร์มนี้ได้ขอความร่วมมือในการเป็นผู้ถูกถ่ายภาพ และข้าพเจ้าเข้าใจดีว่า หากไม่ร่วมมือในการถ่ายภาพ จะไม่มีผลกระทบต่อการได้รับบริการหรือรักษาทางการแพทย์แต่อย่างใด ข้าพเจ้ายอมรับว่าได้รับทราบข้อมูลและคำอธิบายถึงการนำภาพถ่ายไปใช้ทางการศึกษา และข้าพเจ้ายินยอมด้วยความสมัครใจและไม่ต้องการเรียกร้องค่าตอบแทนหรือค่าเสียหายใดๆทั้งในปัจจุบันและอนาคต

ข้าพเจ้ายินยอมให้ภาพถ่ายนี้เป็นส่วนหนึ่งในข้อมูลทางการแพทย์และใช้ในการสอน การนำเสนอในการประชุมวิชาการหรือ ลงตีพิมพ์ในวารสาร

ลายเซนต์.....ผู้ป่วย/ผู้เกี่ยวข้อง
ชื่อเต็ม.....วันที่.....

ผู้วิจัย .....วันที่.....
ชื่อเต็มนางสาวธัสมน นามวงษ์
แบบบันทึก: ภาพถ่าย

หากข้าพเจ้าตัดสินใจที่ขอยกเลิกการยินยอมหลังจากนี้ ข้าพเจ้ายอมรับได้ว่า ภาพถ่ายนี้อาจมีการเผยแพร่ต่อที่สาธารณะชนไปก่อนแล้วได้

Information sheet in Thai version

Patient Information Sheet
Version 1: 11 March 2008

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INFORMATION SHEET

คำอธิบายโครงการวิจัยสำหรับผู้ป่วย

เรื่อง การพัฒนาแนวการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวาน ในประเทศไทย

ท่านได้รับเกียรติให้เป็นส่วนหนึ่งของงานวิจัยในการสำรวจปัญหาการดูแลเท้าของผู้ป่วยเบาหวานในประเทศไทย สิ่งสำคัญสำหรับท่านก่อนที่เข้าร่วมโครงการวิจัยนี้เพื่อให้เข้าใจเหตุผลของการทำวิจัย และสิ่งที่เกี่ยวข้องในงานวิจัยนี้ โปรดใช้เวลาในการอ่านข้อมูลดังต่อไปนี้ หากท่านมีข้อสงสัยใดๆ หรือต้องการข้อมูลเพิ่มเติม ผู้วิจัยยินดีตอบข้อคำถามของท่านตลอดเวลา

งานวิจัยนี้เป็นส่วนหนึ่งของการศึกษาระดับปริญญาเอก สาขาการพยาบาลผู้สูงอายุ ที่มหาวิทยาลัยดิมองฟอร์ด ประเทศสหราชอาณาจักรอังกฤษ จุดประสงค์ในงานวิจัยนี้ เพื่อพัฒนาการดูแลเท้าสำหรับผู้ป่วยเบาหวานในประเทศไทย ซึ่งจะเป็นส่วนหนึ่งในการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้า สำหรับผู้ป่วยเบาหวานในประเทศไทย โดยจะทำการสำรวจการดูแลเท้าผู้ป่วยเบาหวานและหาวิเคราะห์ประเด็นสำคัญของการดูแลเท้าในผู้ป่วยเบาหวานจากการปฏิบัติการพยาบาล

จากที่ท่านมีประสบการณ์ของโรคเบาหวานจึงมีบทบาทสำคัญในการเป็นผู้ให้ข้อมูลเกี่ยวกับการดูแลเท้าของตนเอง และบอกถึงปัญหาของการดูแลเท้า ดังนั้นท่านเป็นส่วนสำคัญในการศึกษา

การศึกษาครั้งนี้จะดำเนินการโดย น.ส.ธัสมน นามวงษ์ นักศึกษาพยาบาลปริญญาเอก ที่คณะวิทยาศาสตร์สิ่งแวดล้อมและสุขภาพ มหาวิทยาลัยดิมองฟอร์ด ประเทศอังกฤษ

การเข้าร่วมในการให้ข้อมูลครั้งนี้เป็นไปด้วยความสมัครใจของท่าน ท่านเลือกหรือไม่เลือกเข้าร่วมวิจัยจะไม่กระทบต่อการรักษาหรือการบริการที่ท่านจะได้รับแต่อย่างใด หากท่านยินดีเข้าร่วมในการวิจัย ในระหว่างที่ทำการวิจัยท่านสามารถขุดิการตอบ หรือถอนตัวจากการวิจัยได้ โดยไม่มีผลกระทบต่อการรักษาและการดูแลที่ท่านได้รับ ถ้าท่านยินดีเข้าร่วมงานวิจัยนี้ ท่านจะถูกขอให้ลงนามในใบยินยอมเข้าร่วม

การศึกษาวิจัยนี้จะใช้การสัมภาษณ์ผู้ป่วยที่มารับบริการที่ในคลินิกเบาหวาน โดยใช้เวลาการสัมภาษณ์ประมาณ 45 นาที ระหว่างการสัมภาษณ์ท่านสามารถซักถามปัญหาที่ท่านสงสัยได้ การสัมภาษณ์นี้จะไม่รบกวนคิวของการเข้าพบแพทย์ และซักถามขณะที่ท่านนั่งรอพบแพทย์และแพทย์ตรวจท่านจะไม่ได้รับทราบผลของการสัมภาษณ์ หากท่านรู้สึกไม่ดี มีอาการใจสั่น หน้ามืด ระหว่างการสัมภาษณ์ ผู้วิจัยจะหยุดสัมภาษณ์และให้การช่วยเหลือท่านด้วยทีมพยาบาล ในการสัมภาษณ์นี้ท่านจะไม่ได้ค่าตอบแทนใดๆ จากผู้วิจัยหรือโรงพยาบาล

ข้อมูลที่ได้จากการสัมภาษณ์ของท่านจะเป็นความลับและไม่ถูกเปิดเผย บางข้อมูลจะนำเสนอในวิทยานิพนธ์ และตีพิมพ์ในวารสารทางการพยาบาล ผลการสัมภาษณ์จะใช้ในการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวาน จะไม่มีการระบุชื่อของผู้ให้สัมภาษณ์ ข้อมูลที่อยู่ในเทปบันทึกเสียงและการถอดเทปจะให้เป็นรหัส ไม่ระบุชื่อและเก็บรักษาไว้อย่างปลอดภัย สามารถศึกษาได้เฉพาะผู้วิจัย อาจารย์ที่ปรึกษาเท่านั้น และเมื่อสิ้นสุดการงานวิจัยข้อมูลดังกล่าวจะถูกทำลาย

ระหว่างที่เข้าร่วมงานวิจัยหากท่านมีข้อคับข้องใจสามารถติดต่อโดยตรงที่ผู้วิจัย น.ส.ธัสมน นามวงษ์ เบอร์โทร 039-330073 ต่อ 233 หรือ วิทยาลัยพยาบาลพระปกเกล้า จันทบุรี อ.เมือง จันทบุรี

ธัสมน นามวงษ์ ผู้วิจัย

Nurse/Educator Information Sheet
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คำอธิบายโครงการวิจัยสำหรับพยาบาลและอาจารย์พยาบาล

เรื่อง การพัฒนาแนวการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวาน ในประเทศไทย

ท่านได้รับเกียรติให้เป็นส่วนหนึ่งของงานวิจัยในการสำรวจปัญหาการดูแลเท้าของผู้ป่วยเบาหวานในประเทศไทย สิ่งสำคัญสำหรับท่านก่อนที่เข้าร่วมโครงการวิจัยนี้เพื่อให้เข้าใจเหตุผลของการทำวิจัย และสิ่งที่เกี่ยวข้องในงานวิจัยนี้ โปรดใช้เวลาในการอ่านข้อมูลดังต่อไปนี้ หากท่านมีข้อสงสัยใดๆ หรือต้องการข้อมูลเพิ่มเติม ผู้วิจัยยินดีตอบข้อคำถามของท่านตลอดเวลา

งานวิจัยนี้เป็นส่วนหนึ่งของการศึกษาระดับปริญญาเอก สาขาการพยาบาลผู้สูงอายุ ที่มหาวิทยาลัยดิมองฟอร์ด ประเทศสหราชอาณาจักรอังกฤษ จุดประสงค์ในงานวิจัยนี้ เพื่อปรับปรุงการดูแลเท้าสำหรับผู้ป่วยเบาหวานในประเทศไทย จะเป็นส่วนหนึ่งในการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้า สำหรับผู้ป่วยเบาหวานในประเทศไทย โดยจะทำการสำรวจการดูแลเท้าผู้ป่วยเบาหวานและหาวิเคราะห์ประเด็นสำคัญของการดูแลเท้าในผู้ป่วยเบาหวานจากการปฏิบัติการพยาบาล

จากที่ท่านมีประสบการณ์ของการดูแลผู้ป่วยเบาหวานจึงมีบทบาทสำคัญในการเป็นผู้ให้ข้อมูลเกี่ยวกับการดูแลเท้าของตนเอง และบอกถึงปัญหาของการดูแลเท้า ดังนั้นท่านเป็นส่วนสำคัญในการศึกษาวิจัยครั้งนี้

การศึกษาครั้งนี้จะดำเนินการโดย น.ส.ธัสมน นามวงษ์ นักศึกษาพยาบาลปริญญาเอก ที่คณะวิทยาศาสตรสิ่งแวดล้อมและสุขภาพ มหาวิทยาลัยดิมองฟอร์ด ประเทศอังกฤษ

การเข้าร่วมในการให้ข้อมูลครั้งนี้เป็นไปด้วยความสมัครใจของท่าน ท่านเลือกหรือไม่เลือกเข้าร่วมวิจัยจะไม่กระทบต่อหน้าที่ของท่านแต่อย่างใด หากท่านยินดีเข้าร่วมในการวิจัย ระหว่างการวิจัยท่านสามารถยุติการตอบ หรือถอนตัวจากการวิจัยได้ ถ้าท่านยินดีเข้าร่วมงานวิจัยนี้ ท่านจะถูกขอให้ลงนามในใบยินยอมเข้าร่วม

การศึกษาวิจัยนี้จะใช้การสัมภาษณ์ ระยะเวลาในการสัมภาษณ์ประมาณ 60 นาที ท่านจะได้รับการสัมภาษณ์เกี่ยวกับการให้คำปรึกษาเรื่องการดูแลเท้า การจัดการดูแลเท้าในผู้ป่วยเบาหวาน โดยให้ท่านเสนอความคิดเห็นต่อกรณีศึกษาผู้ป่วยเบาหวานที่มีแผลที่เท้า ในการให้ข้อมูลครั้งนี้ ท่านจะไม่ได้ค่าตอบแทนในการให้ข้อมูลแต่อย่างใด

ข้อมูลที่ได้จากการสัมภาษณ์ของท่านจะเป็นความลับและไม่ถูกเปิดเผย บางข้อมูลจะนำเสนอในวิทยานิพนธ์ และตีพิมพ์ในวารสารทางการพยาบาล ผลการสัมภาษณ์จะใช้ในการพัฒนาแนวทางการปฏิบัติการพยาบาลการดูแลเท้าในผู้ป่วยเบาหวาน จะไม่มีการระบุชื่อของผู้ให้สัมภาษณ์ ข้อมูลที่อยู่ในเทปบันทึกเสียงและการถอดเทปจะให้เป็นรหัส ไม่ระบุชื่อและเก็บรักษาไว้อย่างปลอดภัย สามารถศึกษาได้เฉพาะผู้วิจัย อาจารย์ที่ปรึกษาเท่านั้น และเมื่อสิ้นสุดการงานวิจัยข้อมูลดังกล่าวจะถูกทำลาย

ระหว่างที่เข้าร่วมงานวิจัยหากท่านมีข้อคับข้องใจสามารถติดต่อโดยตรงที่ผู้วิจัย น.ส.ธัสมน นามวงษ์ เบอร์โทร 039-330073 ต่อ 233 หรือ วิทยาลัยพยาบาลพระปกเกล้า จันทบุรี อ.เมือง จันทบุรี

ธัสมน นามวงษ์ ผู้วิจัย

Appendix 6 Questionnaire for Delphi Technique in Round 1 and 2

Appendix 6.1 Questionnaire for The Delphi technique, English version

Appendix 6.1.1 Questionnaire in Round 1

Questionnaire

Nursing practice guideline for foot care For type 2 diabetes patients in Thailand

Developed by
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PhD candidate

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Instruction

This questionnaire, developed as part of a research programme, is being used to investigate diabetic foot care in Thailand. The Delphi technique has been applied. The questionnaire will be sent to you for two rounds to elicit your ideas about the management of diabetic patients and your experiences of foot care.

For this first round, the specific objective is to explore current foot care practices for diabetic patients in Thailand. The questionnaire relates to the issues of preventing foot ulcers, assessing risk factors, and implementing nursing care in diabetic patients. Please give your comments and rationales in short statements or phrases for the further updated version.

Guideline Name:

Nursing practice guideline for foot care for type 2 diabetes patients in Thailand: assessment and management of foot complications

Introduction

Diabetes is a chronic disease that is threatening people around the world. Even though diabetes is currently well treated and managed, the number of patients with disabetes has been dramatically increasing. For instance, in 2000, there were around 171 million people with diabetes and this number was estimated to increase up to at least 366 millions by 2030 (WHO 2002; Wild et.al 2004). Diabetes is divided into 2 types consisting of type 1 (in which insulin is totally lacking), whereas a relative lack of insulin is found in type 2 diabetes. Diabetes affects people physically and emotionally in all age groups. The patho-physiological disorder in diabetes is an absolute or relative lack of insulin which is insufficient for the body's needs, resulting in a raised blood glucose concentration. Not only does this pathophysiological disorder affects health, but its complications are also life-threatening. Among its complications, foot ulcers are often developed resulting in the increased cost of care and the increased risk of foot amputation.

The development of diabetic foot ulcers is a worldwide problem which impacts patients' quality of life, economic sttatus, morbidity, mortality, and amputation rate (Wieman 2005). In the US the cost of foot ulcer management exceeds all of the cost for renal dialysis (Wieman 2005). Diabetic foot complications often lead to an amputation, thus increasing the burden on both hospital services and home health care. Due to the foot complications, patients' families are at high risk of having more burden, resulting in the decreased quality of patients' lives. The increased medical cost is a major financial burden that patients and their family have to take care of. The average cost of care for a Thai diabetes patient was 6331 Thai baht (158.28 US dollars) (Riewpaiboon et al. 2007). Besides, diabetic foot ulcers have a severe negative effect on physical functions, psychological status, and social situations (Goodridge et al. 2005) involving an impact on health-related quality of life in diabetes patients with foot ulcers and in similar to patients with lower extremity amputation (Willrich et al. 2005).

The prevention of diabetic complications is a key concept that can be used to reduce the cost of care and the rate of amputation. Eventually, the patients' quality of life is aimed to be promoted. Educating diabetes patients on foot care is an important strategy that can be applied to reduce the incidence of foot ulcers or amputations; especially, a single intervention targeted to manage modifiable risk factors (Reiber & Raugi 2005). Hence, to promote success of diabetes complication prevention, a foot care programme needs a dedicated leader, health care provider collaborative team work, a good planning model for change, and a comprehensive care system.

Scope of guideline
Diabetic foot complications including foot ulceration, diabetic foot ulcers and/or amputation

Guideline objective
-To address the questions of how to assess and manage health problems of patients diagnosed with diabetes
-To provide clinical practice guidelines to clinical nurses who provide care to patients with type 2 diabetes having diabetic foot ulcers in all health care settings
-To carry out a risk assessment for foot ulcers and to prevent, through health education, foot ulcers of patients with type 2 diabetes who are at high risk of developing such ulcers
-To implement appropriate preventive nursing interventions to diabetes patients who are at higher risk of having foot ulcers and/or amputations

Target population
People with type 2 diabetes who are at high risk for developing foot ulcers

Definition of Terms
Diabetes foot

Classification of risk:
Identify the category of risk in diabetes patients that influences the incidence of foot ulcers. The category will be classified into 4 groups: low risk, increased risk, high risk, and foot ulcers. A multidiscipinary foot care team includes physicians with diabetes specialty, surgeons, orthopedicians, physical therapists, nurses with diabetes specialty.

Guideline category
Counselling
Management
Prevention
Risk Assessment
Evaluation

Clinical specialty
Dermatology
Endocrinology
Family Practice
Nursing
Orthopedic Surgery
Physical Medicine and Rehabilitation
Pediatrics
Plastic Surgery
Physiologist

Intended users
Advanced Practice Nurses
Specialist Nurses /Nurse

Interventions and practices considered
Risk Assessment/Prevention
1. Annual foot examinations
2. Assessment of risk factors, including history of previous foot ulcers, sensation, structural and biomechanical abnormalities, circulation, and self-care and knowledge
3. Risk classification

4. Patient Education

Management/Counselling
Patient education

Major outcome considered
Incidence of foot ulceration and amputation
Description of the methods used to analyse the evidence
Systematic review

Methods used to formulate the recommendations
Expert consensus and literature review based on evidence and interview data

Methods used to assess the quality and strength of the evidence
Weighting according to a rating scheme (scheme given)

Rating scheme for the strength of the evidence
Levels of evidence
Level Ia: Evidence obtained from meta-analysis of randomised controlled trials, plus consensus
Level Ib: Evidence obtained from at least one randomised controlled trial, plus consensus
Level II: Evidence obtained from at least one well-designed controlled study without randomisation or evidence obtained from at least one other type of well-designed quasi-experimental study, plus consensus
Level III: Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies and case studies, plus consensus
Level IV: Evidence obtained from expert committee reports of opinions and/or clinical experiences of respected authorities, plus consensus

Methods to analysis the evidence
Systematic review with evidence tables

Guideline Development Selection
The author will choose an evidence-based practice model as a conceptual framework (Soukup, 2000) to develop the guideline. This model is dynamic with a spiralling movement that includes four interactive phases: evidence-triggered, evidence supported, evidence-observed, and evidence based.
1 Evidence-triggered phase; the starting phase is the problem identified phase which can be taken from:

1.1. Knowledge trigger, refer to document research: analysis and studying intervention foot care guidelines for diabetes patients, key concepts of foot care guidelines and problem of foot diabetes care in Thailand

1.2. Problem – Focus trigger, refer to clinical question often raised by clinicians and from data sources within organisational systems that monitor practice patterns. This phase will be conducted by interview. To interview specialist diabetes nurses who work in foot diabetes clinic, nurse educators who specialise in diabetes foot care to find the problem of the usage of nursing guidelines of foot diabetes care in Thailand, and interview patients to explore the need for health education and foot care practice including foot care management.

2. Evidence-supported phase; this phase focuses on a review of existing evidence for best practice with an emphasis on the evidence triggers to guide the search process. These data will be analysed by systematic analysis to find key components for developing foot care guideline in Thailand and develop questionnaires about key components of foot care nursing guidelines in Thailand.

3. Evidence-observed phase, the proposed practice or comprehensive programme is developed. This study uses product evaluation. The Delphi survey is conducted to find consensus of key components for foot care guideline. A panel of experts will be involved and will participate in this technique. The panel of experts consists of one diabetes medical doctor, six specialist nurses and will be selected by purposive sampling. The consultative session will be conducted by the Delphi technique which consists of at least 2 rounds.

   In round 1 the core component questionnaires will be sent to the panel of experts to review the items and return the complete forms to the researcher by mail

   The results will be analysed and the core components identified. The second questionnaire will be developed from the first results.

   In round 2 the analysed and summarised questionnaires will be sent to the panel of experts in Thailand to reformulate and conclude the core components of a foot care nursing guideline.

4.Evidence-based phase; during this phase, a critical analysis is performed using information, the evidence-supported phase and study finding from the evidenced observed phase.

Summary of Recommandations

General management of foot care

Practice Recommendations *Level of evidence*		
Patient Empowerment and Education	1.1 Effective care and decision making should be shared between patients and health care professionals.	*IV*
	1.2 All patients or caregivers should get an educationsl understanding of their condition and the resources available to optimise their general health, diabetes management and ulcer care.	*Ia*
	1.3 As part of ongoing foot care, patients should arrange recall and have perform on an annual review to detect risk factors for ulceration by trained personnel.	*IV*
	1.4 People who are older and have had diabetes for a long time, have poor vision, have poor footwear, smoke, live alone should be given vigilant care.	*III*
Continuing Professional Development	2.1 Nurse and health care professionals who are involved in the assessment of diabetes feet should obtain adequate training.	*IV*
	2.2 Foot examination to detect risk factors should be performed by a health care professional	*Ib*
	2.3 Foot examination should be performed annually for all diabetes people and with more repeated intervals for those at higher risk	*IV*
Foot Examination and Monitoring	3.1 Foot examination should contain -foot sensation testing with a 10g monofilament or vibration -foot pulse palpation -any foot deformity inspection -footwear inspection	*Ia*
	3.2 Monofilaments should not be used to test more than ten patients in one session and should be left for at least 24 hours to recover (bucking strength) between session	*III*
Holisic Assessment	3.3 Nurses should accomplish a foot risk assessment for diabetic people. This risk assessment includes the following: -History of previous foot ulcers -Sensation by testing with 10 mg monoilament or vibration -Structural and biomechanical abnormalities -Circulation by testing foot, pulse palpation -Self-care behaviour and knowledge	*IV*
	3.4 People with diabetes should be encouraged to undertake self-monitoring and inspection.	*IV*
Classify of risk factors	4.1 Based on assessment of risk factors, patients should be classified as: -lower current risk (normal sensation, palpable pluses) -at increased risk (neuropathy or absent pulses or other risk factor) -at high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcers) -ulcer foot	*III*
Care of people at lower current risk	5.1 Nurse should discuss and agree with patients a management plan which consists of foot care education appropriately so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm.	*II*
	5.2 Patients should be arranged tobe reviewed annually.	*IV*
Care of people at increased risk of foot ulcer	6.1 Patients should be referred to a foot protection team.	*IV*
	6.2 Patients should be arranged to review 3-6 monthly by a foot protective team at review:	*IV*

	-patient's feet inspection -review need for vascular assessment -footwear evaluation	
	6.3 Patients should be offered enhanced foot care education and encouraged to undertake self foot care.	*IV*
Care of people at high risk of foot ulcers	7.1 Patients should be referred to a foot protection team.	*IV*
	7.2 Patients should receive to frequent reviews 1-3 monthly by a foot protection involving: -patient's feet inspection -review need for vascular assessment And evaluate and provide appropriate: -intensified foot care education -specialist footwear and insoles -skin and nail care	*IV*
Care of people with foot ulcer	8.1 A new foot ulcer patient should be urgent assess by an appropriately trained health professional.	*IV*
	8.2 All patients with diabetic foot ulcers should be assessed for signs and symptoms of infection and facilitate appropriate diagonostic testing and treatment.	*Ilb-IV*
Holistic Assessment	8.3 Record and assess a health history, allergies, medications, functional assessment and physical examination: neuropathy, vascular status, callus, infection, foot deformity/pressure ulcer including diabetes management	*Ib-IV*
Vascular Asessment	8.4 Assess vascular status at bilateral lower extremitries for vascular supply and facilitate appropriate diagonotic testing	*IIb-IV*
	8.5 Assess signs and symptoms of infection and facilitate appropriate diagnosistic testing and treatment	*IIa*
	8.6 Assess for autonomic, sensory and motor(S.A.M) changes in order to identify peripheral vascular disease	*II-IV*
	8.7 Assess for deformities, foot pressure, gait, footwear and devices and facilitate appropriate referral	*II-IV*
	8.8 Describe and identify the characteristics of ulcer, identify the location, length, width, depth,assess ulcer bed, exudate, odour and peri-ulcer skin, and classify the ulcer.	*Ia-IV*
	8.9 Assess and optimise systemic, local and extrinsic factors that can influence wound healing.	*IV*
	8.10 Provide wound care, debridement, infection control, a moist wound environment and pressure redistubution	*Ia-III*
	8.11 Individuals assessed as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment or to specialised diabetes or foot care treatment and education teams as appropriate.	*IV*
Patient Empowerment and Education	9.1 All diabetic people or caregiver should receive foot care education on an ongoing basis.	*Ib*
	9.2 Foot care education should be provided to all diabetic patients and reinforced at least annually.	*IV*
	9.3 Nurses in all practice settings should give and reinforce basic foot care education appropriately.	*IV*
	9.4 Patient education approaches should be used differently until optimal methods appear to be identified in terms of desired outcomes.	*II*
	9.5 At the time of first diagnosis structured patient education should be made available to all people with diabetes and then as required on an ongoing basis, based on a formal, regular assessment.	*IV*
	9.6 The basic foot care education for diabetes people should consist of the following element: -Awareness of personal risk factors -Importance of at least annual inspection of feet by a health care	*IV*

	professional -Daily self inspection of feet -Proper nail and skin care -Injury prevention -When to seek help and specialised referral	
	9.7 Education should be modified to patient's current knowledge, individual needs, and risk factors. Principles of adult learning must be used.	*IV*
Education of nurse	10.1 Nurse desires knowledge and skills in the following areas so as to competently assess a patient's risk for foot ulcers and provide the required education and referral: -Skills in conducting an assessment of the five risk factors -Knowledge and skill in educating patients -Knowledge of sources of local referral	*IV*
	10.2Educational institutions should integrate Nursing Practice Guideline *Reducing Foot Complications for People with Diabetes* into basic nursing education curriculum and provide continuing education programmes in this topic area.	*IV*

Part 2 Practice Recommendation -Questionnaire Round 1

Explantion: Please read the statements about guidelines for foot care for diabetic patient in Thaland. Afterwards indicate if you agree or disagree. please give your comment to each statement and give suggestions about your evidence or your experince in each statement

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but improve	No Agree	
Patient empowerment and education 1.0 Effective care and decision making should be shared between patients and health care professional				
1.1 All patients or caregivers should get an education: understanding of their condition and the resources available ulcer to optimize their general health, diabetes management and ulcer care				
1.2 As part of ongoing foot care, professionals should arrange recall and perform on an annual review to detect risk factors for ulceration				
1.3 People who are older and have had diabetes for a long time, poor vision, poor footwear, smoke, live alone should be given vigilant care.				
Continuing professional development 2.1 Nurse and health care professionals involved in the assessment of diabetes feet should obtain adequate training**.**				
Foot examination and monitoring 3.1 Foot examination should contain -foot sensation testing with a 10g monofilament or vibration -foot pulse palpation -any foot deformity inspection -footwear inspection				
3.2 Monofilaments should not be used to test more than ten patients in one session and should be left for at least 24 hours to recover (bucking strength) between session				
Holistic assessment 3.3 Nurses should accomplish a foot risk assessment for diabetes people. This risk assessment includes the following: -History of previous foot ulcers -Sensation by testing with 10 mg- monoilament or vibration -Structural and biomechanical abnormalities -Circulation by testing foot pulse palpation -Self-care behaviour and knowledge (Refer to Appendix B,C,D,E)				
3.4 People with diabetes should be encouraged with self-monitoring and inspection of foot				
Classification of risk factor 4.0 Based on assessment of risk factors, patients should be classified as: -lower current risk (normal sensation, palpable pluses) -at increased risk (neuropathy or absent pulses or other risk factor) -at high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcers) -ulcer foot				

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but improve	No Agree	
Care of people at lower current risk 5.0 Nurses should discuss and agree with patients a management plan which consists of an appropriate foot care education programme so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm				
5.1 Patients who is at lower current risk should be reviewed annually				
Care of people at increased risk 6.0 Patients who are at increased risk should be referred to a foot protection team				
6.1 Patients who is at increased risk should be arranged to review 3-6 monthly by a foot protection team at review: -patient's feet inspection -review need for vascular assessment -footwear evaluation				
6.2 Patients who are at risk if developing foot such ulcers such as those with neuropathy should have enhanced foot care education and be encouraged to undertake self foot care.				
Care of people at high risk of foot ulcer 7.0 Patients who is at high risk of foot ulcer should be referred to a foot protective team				
7.1 Patients with high risk of foot ulcer should have frequent reviewed 1-3 monthly by a foot protection team at review: -patient's feet inspection -review need for vascular assessment And evaluate and provide appropriate: -intensified foot care education -specialist footwear and insoles -skin and nail care				
Care of people with foot ulcers 8.0 A patient with a new foot ulcer should be urgently assessed by an appropriately trained health professional				
8.1 All patients with diabetic foot ulcers should be assessed for signs and symptoms of infection and facilitate appropriate diagonostic testing and treatment.				
8.2 Record and assess a health history,allergies,medications, functional assessment and physical examination: neuropathy, vascular status, callus, infection, foot deformity/pressure ulcer including diabetes management				
Vascular assessment 8.3 Assess vascular status at bilateral lower extremities for vascular supply and facilitate appropriate diagonosis testing				
8.4 Assess signs and symptoms of infection and facilitate appropriate diagnostic testing and treatment				
8.5 Assess for autonomic, sensory and motor(S.A.M) changes in order to identify peripheral vascular problem				
8.6 Assess for deformities, foot pressure, gait, footwear and devices and facilitate appropriate referral				

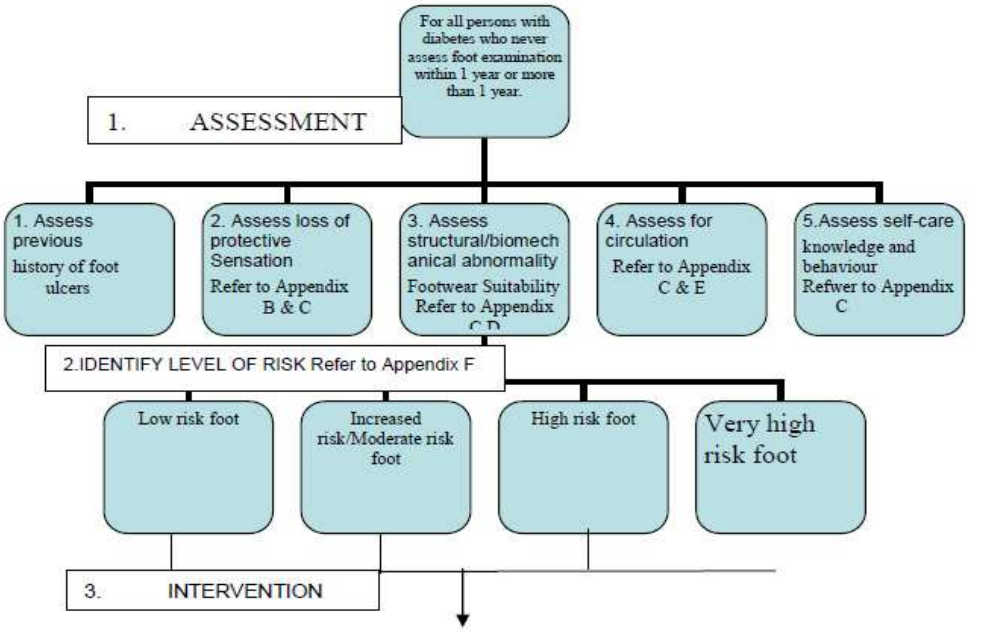
Statement	Opinion			Comment /suggestion
	Strongly	Agree but ...	No Agree	
8.7 Describe and identify the characteristics of the ulcer, identify the location, length, width, depth,assess ulcer bed, exudate, odour and peri-ulcer skin, and classify the ulcer (Appendix G)				
8.8 Assess and optimise systemic, local and extrinsic factors that can influence wound healing.				
8.9 Provide wound care, debridement, infection control, a moist wound environment and pressure redistubution				
8.10 Individuals assessed as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment or to specialized diabetes or foot care treatment and education teams as appropriate.				
Patient empowerment and education 9.0 All persons with a dianosis of diabetes or caregivers should receive foot care education on an ongoing basis.				
9.1 Foot care education should be provided to all diabetes patients and reinforced at least annually.				
9.2 Nurses in all practice settings should give and reinforce basic foot care education appropriately.				
9.3 Patient education approaches should be used differently until optimal methods appear to be identified in terms of desired outcomes				
9.4 At the time of first diagnosis structured patient education should be made available to all people with diabetes and then as required on an ongoing basis, based on a formal, regular assessment. (Apendix H)				
9.5 The basic foot care education for people with diabetes should consist of the following elements: -Awareness of personal risk factors -Importance of at least annual inspection of feet by a health care professional -Daily self inspection of feet -Proper nail and skin care -Injury prevention -When to seek help and specialized referral				
9.6 Education should be modified to patient's current knowledge, individual needs, and risk factors. Principles of adult learning must be used.				
Education of nurse 10.0 Nurses should have the knowledge and skills in the following areas so as to competently assess a patient's risk for foot ulcers and provide the required education and referral: -Skills in conducting an assessment of the five risk factors -Knowledge and skill in educating patients -Knowledge of sources of local referral				
10.1 Health/Nursing Educational institutions should integrate Nursing Practice Guideline *Reducing Foot Complications for People with Diabetes* into basic nursing education curriculum and provide continuing education programmes in this topic area				

Appendix A: Risk Assessment Algorithm แผนภูมิการประเมินความเสี่ยง

(Foot Care Risk Reduction Guideline)

Consider when best initiated for the individual, given priority within current issues and appropriateness of education on this issue at this time.

Assessment of the five factors most strongly correlated with risk of foot ulcer/amputation should be performed at least annually.

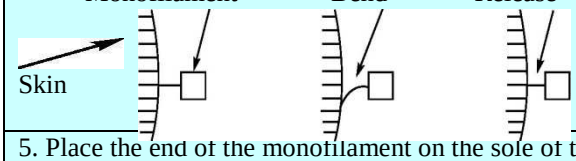
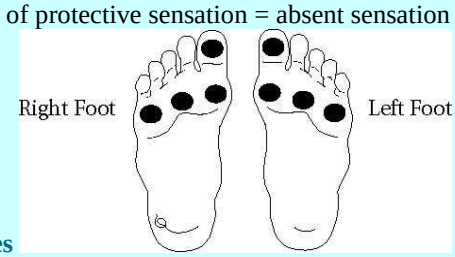


Basic Education Intervention Appendix H
(tailor to individual risk and need)

- Explain risk for foot complications due to impaired sensation, circulation and relationship to blood glucose control.
- Provide self-care education to patient and/or caregiver, if possible. Should include: level of personal risk, inspection by self and professional, wearing protective footwear, general nail and skin care, when to seek referral.
- Refer to Diabetes Education Centre or specialist foot clinic for more education

Referral

Determine if the individual is already receiving the services of a foot care specialist. Facilitate referral to primary care provider for additional assessment or to specialized diabetes or foot care treatment and education teams as appropriate.

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but have	No Agree	
Appendix B *Use of the Semmes-Weinstein Monofilament* **Directions for use of Semmes –Weinstein Monofilament** The sensory test should be done in a quiet and relaxed site. 1. Assess integrity of monofilament (no bends/breaks).				
2. Show the monofilament to the patient. Place the end of the monofilament on his/her hand or arm to show that the testing procedure will not hurt.				
3. Ask the patients to turn his/her head and close his/her eyes or look at the ceiling.				
4. Hold the monofilament perpendicular to the skin. Monofilament Bend Release  Skin				
5. Place the end of the monofilament on the sole of the foot and NOT on an ulcer site, scar, callus or necrotic tissue. Ask the patient to say 'yes' when he/she feels you touching his/her foot with the monofilament. DO NOT ASK THE PATIENT, "did you feel that?" If the patient does not say 'yes' when you touch a given testing site, continue on to another site. When you have completed the sequence RETEST the area(s) where the patient did not feel monofilament				
6. Press the monofilament to the skin until it bends, and then hold for 1-3 seconds.				
7. Lift the monofilament from the skin. Do not brush or slide along the skin.				
8. Repeat the sequence randomly at each testing site on the foot (see pictures below). **Sites on the sole of the foot for monofilament testing** Loss of protective sensation = absent sensation at one or more sites.  Right Foot Left Foot **Notes** Apply only to intact skin. Avoid calluses, ulcerated or scarred areas. DO NOT use a rapid or tapping movement. • If the monofilament accidentally slides along the skin, retest that area later in the testing sequence. • Store the monofilament according to the manufacturer's instructions. Clean the monofilament according to agency infection control protocols.				

Appendix C: Diabetes Foot Assessment/Risk Screening Guide

Use this guide to assess presence of potential risk factors for future foot ulceration and amputation.

Examine both feet and inquire about patient self-care practices.

Risk Factor	**Yes**	**No**	**Opinion**			**Comment /suggestion**
			Strongly Agree	Agree but have to .	Disagree	
1. Foot ulcer (a wound that took > 2 weeks to heal) now or in the past.						
2. Loss of sensation at any one site (determined after testing the 4 sites: great toe, first, third, and fifth metatarsal heads using the 10 Gram/ 5.07 monofilament).						
3. Callus present on soles of feet or toes or abnormal foot shape (e.g., claw or hammer toes, bunion, obvious bony prominence, Charcot's foot or joint).						
4.Pedal pulses (dorsalis pedis or posterior tibial) not palpable by nurse and positive history of lower limb pain on exertion that is relieved with rest						
5.Patient unable to see the bottom of feet and/or unable to reach the bottom of feet and does not have someone who has been taught to perform appropriate foot care/inspection						
6. Poor fitting footwear (shoes too narrow or short, no toe protection, rough or worn interior, uneven wear on sole or heel).						
7. Patient **has not** received foot care education before. .						
8. Patient **does not** check condition of feet most days, e.g., ask "How do you know if you have a reddened area or other problem with your feet?" or "How often do you check your feet?"						
9. Patient **does not** report foot problems to health care provider, e.g., ask, "What would you do if you found a blister on your foot?"						
10. Patient **does not** take steps to reduce risk of injury, e.g., ask if client walks bare foot in/outdoors, checks for foreign objects in shoes before wearing them, checks water temperature before entering a bath, etc.						
"Lower Risk" If a patient answers NO to any items 1-4, they are at "lower risk". / **"Higher Risk"** If a patient answers YES to any items 1-4, they are at "higher risk".						
If the patients answers YES to any items 5-10, this indicates a self-care knowledge deficit and opportunity to enhance self-care knowledge and behaviour						

Appendix D: ***(Structural and Biomechanical Abnormalities)***

1. Take off shoe and foot exam when standing, sitting and lying

2. Assess footwear and advise on the appropriate footwear for diabetic patients

Bony and soft tissue deformities including:	**Right**	**Left**	
□□Toe deformities (claw or hammer toes)			
□□Prominent metatarsal heads with inadequate soft tissue padding			
□□Hallux valgus (bunions)			
□□Bony Prominence			
□□Partial foot Amputation			
□□BKA,AKA			
□□Charcot's joint (foot warm, swollen, red and painless during active phase)			
□□Blister			
□□Callus/Corn			
□□Fungal infection.			
□ Other			

Opinion □ Strongly Agree □ Agreed, but must improve □ disagree

Suggestion

Guideline for appropriate footwear evaluation (Modified from Nancarrow 1999 and Canada Guideline 2008)

Item	Yes	No
1.The heel of the shoe is less than 1 inch (2.5 cm)		
2.The shoes has adjustable laces or buckles, to hold shoes onto foot		
3 The length of the space between the tip of longest toe and the end of the shoe is at least 1-2 inches when standing		
4.The shoes have a well-padded soles		
5.The shoes must cover the front of part of the feet and wrap around the heel to prevent possible injuries		
6. Shoe material is made of cloth and/or leathers which promote better air circulation and inhibit fungal growth.		
7. The shoe shape has the similar shape as the feet.		
8. The heel counter of shoe is fit and firm.		
9. The width and the length of each shoe should be unequal because the size of each foot is naturally different.		
10. Location of the first metatarsals phalangeal should be located at the widest width of the shoe		
11. The area inside the shoes at the fore foot part and across the site of metatarsophalangeal joints should be wide and deep enough to promote the comfortable movement of the shoes.		

Opinion □ Strongly Agree □Agreed, but must improve □ disagree

Suggestion

Appendix E : Location and Palpation of Pedal Pulses

Dorsalis Pedis: To palpate pulse, place fingers just lateral to the extensor tendon of the great toe. If you cannot feel a pulse, move fingers more laterally

Posterior Tibial: To palpate pulse, place fingers behind and slightly below the medial malleolus of the ankle. In an obese or edematous ankle, the pulse may be more difficult to feel.

Note: To enhance technique: Assume a comfortable position for you and the patient. Place hand in position and linger on the site. Varying pressure may assist in picking up a weak pulsation. Do not confuse patient's pulse with your own pulsating fingertips. Use your carotid pulse for comparison, if needed.

Strongly Agree Agreed, but must improve disagree

Comment……

Suggestion ……

Appendix F The classification of four stage risk classification of the diabetic foot

	Definition	**History**	**Sensation**	**Deformities**	**Circulation**	**Self-care knowledge**
Low risk (0)	No sensory	-	Normal	-	-	
At increased risk(1)	Sensory Neuropathy	-	Loss 1 point	+	Absent pulse	
At high risk(2)	Sensory Neuropathy plus deformity or peripheral vascular problem	-	Loss more than 1 point	+	Absent pulse	
Very high risk/previous foot ulcer(3)	Previous ulcer or lower extremity	+	Loss more than 1 point	+ / Amputation	Absent pulse	

(Adapted from: Perters and Lavery 2001; IWGDF 2007)

Strongly Agree Agreed, but must improve disagree

Comment……

Appendix G Grading a diabetic foot ulcer

Grading a diabetic foot ulcer

The two systems below are commonly used to grade diabetic foot ulcers.
Meggit-Wagner Ulcer Classification
These grades are based on ulcer depth and don't consider infection or ischemia.
Grade 0—preulcerative lesions, healed ulcer, or bony deformity
Grade 1—superficial ulcer; no subcutaneous tissue involvement
Grade 2—full-thickness ulcer; may expose bone, tendon, ligament, or joint capsule
Grade 3—ostitis, abscess, or osteomyelitis
Grade 4—gangrene of toe
Grade 5—gangrene of foot
University of Texas Staging System
Under this system, a wound is assigned a stage based on the presence or absence of infection and ischemia, and a grade based on the depth of the wound. The higher the grade and stage, the greater the risk of amputation.
□□Stage A—clean wounds (lowest risk)
□□Stage B—nonischemic infected wounds
□□Stage C—ischemic noninfected wounds
□□Stage D—ischemic infected wounds
□□Grade 0—preulcerative or postulcerative lesion, completely epithelialized
□□Grade I—superficial wound, not involving tendon, capsule, or bone
□□Grade II—wound penetrating to tendon or capsule
□□Grade III—wound penetrating to bone or joint

Which system of foot ulcer grading do you use in your unit? Why to use? What problem do you face with using this system?
Comment……

Suggestion ……

Did you know that having diabetes puts you at risk of developing complications such as foot ulcers?

Yearly exam needed
Have a health professional examine your feet at least once a year.
Find out if you have lower or higher risk feet.

Risk Factors for Foot Ulcers:

- A previous foot ulcer
- Loss of normal feeling in your feet
- Abnormal shaped foot, including calluses, and bunions
- Poor circulation to your feet

Managing your blood sugar is important for healthy feet – See your healthcare provider! Get complete diabetes education.

Protect your feet – Follow these simple guidelines:

1. Check your feet daily

- Look at your bare feet everyday for red areas, blisters or any open area. If you cannot do this yourself, have someone else check for you.
- Use a mirror to look for the bottom of feet. If you cannot see or have a trouble with your sight, ask for some help from your family.
- See your doctor or foot specialist right away if you find a problem!

2. Protect your feet - always wear shoes!

- Wear comfortable shoes that fit well, support your foot and are not too tight. Do not wear shoes that cause reddened or sore areas.
- See a specialist for footwear advice if you have a higher risk foot.
- Don't walk barefoot in/out the house
- Feel inside your shoes before putting them on each time to make sure the lining is smooth and there are no foreign objects
- Wear soaks at night time

3. Keep your skin clean and soft

- Wash your feet in warm, not hot water regularly, but do not soak them. Dry your feet well between your toes. Check that the water is not too hot before putting your feet in it.
- Use unscented creams/lotion. Rub a thin coat of skin lotion over the tops and the bottoms of your feet. Do not put cream between the toes.

4. Don't hurt yourself with nail clippers or razors

- Cut your nails straight across and file the edge with an emery board or nail file. Get help to cut your nails, if needed.

Don't cut calluses. See a local foot care clinic.

Appendix I Guideline of choosing foot wears for neuropathy.

Characteristic	Appropriate foot wear	Reasoning
Normal foot	Can use every style	
Neuropathic foot	-Shoe not too tight or too loose -Sport shoe with moulded insole	Moulded insole reduce heel mean peak pressure, forefoot pressure(Windle et al. 1999)
Neuropathic foot plus deformity -Claw toe -Hammer toes -Bunion	-Simple sandal has back strap with orthotic-arch support -Metatarsal pad -Pronator/ supinator wedge	Moulded insole
Neuropathic foot plus deformity and history of ulcer/ marked scarring	-Insole or moulded sandal -Sport shoe with moulded insole -Adjustable custom moulded shoe with moulded insole	
Charcot foot or unstable ankle	Custom mould shoe/boot with moulded insole and rigid rocker under sole	Custom mould shoe reduce the forefoot peak plantar pressure and restructure the force through plantar surface(Beuker et al. 2005)

Note Open sandals are not recommended for patients with neuropathic foot
(From Apelqvist et al. 2008, Bus et al. 2008, Dahmen et al. 2004, IWGDF 2007)

Appendix 6.1.2 Questionnaire Round 2

Nursing practice guideline for foot care for type 2 diabetes patients in Thailand
(Reviewed Version 1)

Developed by
Tassamon Namwong
PhD Candidate

School of Nursing and Midwifery
Faculty Health and Life Science
De Montfort University, Leicester
United Kingdom

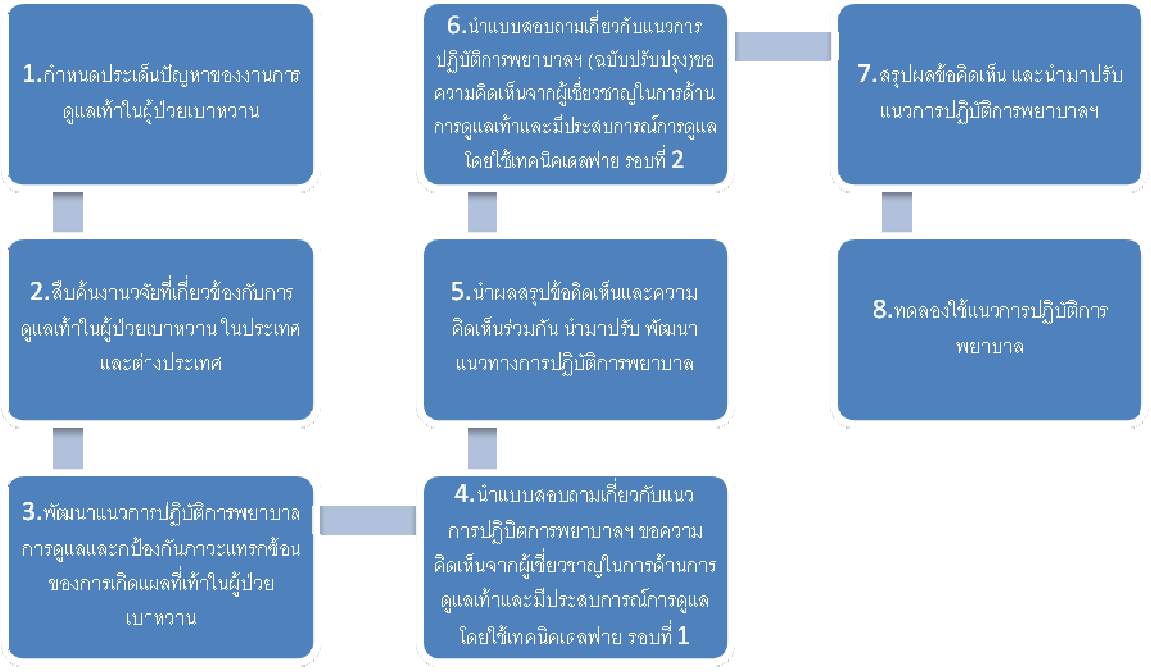
Instruction

Dear Expert:

Enclosed: 1.The first-round questionnaire and its agreement scores (greenish document)
2. (Instruction of questionnaire)
3. The second-round questionnaire (Document #2 in white colour)

Thank you for your participation in the development of a nursing practice guideline for foot care for diabetes patients Please find the instruction for answering all questions of this second-round questionnaire below:

1. The process of the nursing practice guideline development is during the step 6 of the second-round questionnaire development.



2. Response Guide

Please read the instruction in answering the second-round questionnaire carefully.

This second-round questionnaire is originally constructed based on the agreement of opinions of all experts. Their agreement can be found on the agreement report (attached greenish document). If the expert agreement of the item is more than 70%, the content of that item will not be revised. Only language is modified in order to promote better understanding.

After reading these updated questions in this second-round questionnaire, Please give your opinions in the provided spaces. If you want to review the first-round questions to support your new opinions, you can find these questions in the provided documents as attached.

3. Please finish your response within 2 weeks and send me all enclosed questionnaires using the enclosed envelope. I will very appreciate that.

Tassamon Namwong
PhD Candidate, De Montfort University

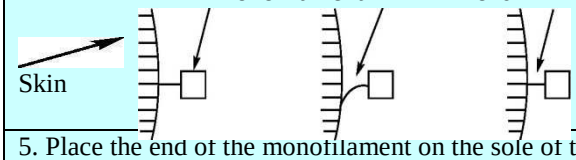
Part 2 Practice Recommendation -Quationnaire Round 2

Explantion: Please read the statements about guideline for foot care for diabetic patient in Thaland. Afterwards indicate if you agree or disagree. please give your comment to each statement and give suggestions about your evidence or your experince in each statement

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but improve	No Agree	
Patient and caregiver empowerment and education 1.Effective care and decision making should be shared between patients, **caregivers** and health care professional (D)				
1.1 All patients or caregivers should get an education: understanding of their condition and the resources available toulcer optimize their general health, diabetes management and ulcer care				
1.2 As part of ongoing foot care, professionals **and foot care teams** should arrange recall and perform on an annual review to detect risk factors for ulceration				
1.3 People who are older and have had diabetes for a long time, poor vision, poor footwear, smoke, live alone should be given vigilant care.				
1.4 (9.2) Nurses in all practice settings should give and reinforce basic foot care education appropriately.				
1.5 (9.3) Patient education approaches should be used differently until optimal methods appear to be identified in terms of desired outcomes				
1.6 (9.4) At the time of first diagnosis structured patient education should be made available to all people with diabetes and then as required on an ongoing basis, based on a formal, regular assessment. (Apendix H)				
1.7 (9.5) The basic foot care education for people with diabetes should consist of the following elements: -Awareness of personal risk factors -Importance of at least annual inspection of feet by a health care professional -Daily self inspection of feet -Proper nail and skin care -Injury prevention -When to seek help and specialised referral				
1.8 (9.6) Education should be modified to patient's current knowledge, individual needs, and risk factors. Principles of adult learning must be used.				
Continuing professional development 2.1 Nurse and health care professionals involved in the assessment of diabetes feet should obtain adequate training**.**				
2.2 (10.0) Nurses should have the knowledge and skills in the following areas so as to competently assess a patient's risk for foot ulcers and provide the required education and referral: -Skills in conducting an assessment of the five risk factors -Knowledge and skill in educating patients -Knowledge of sources of local referral				
2.3 (10.1) Health/Nursing Educational institutions should integrate Nursing Practice Guidelines *Reducing Foot Complications for People with Diabetes* into basic nursing education curriculum and provide continuing education programmes in this topic area				

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but .	No Agree	
Foot examination and monitoring 3.1 Foot examination should contain -foot sensation testing with a 10g monofilament or vibration -foot pulse palpation -any foot deformity inspection -footwear inspection				
3.2 Monofilaments should not be used to test more than ten patients in one session and should be left for at least 24 hours to recover (bucking strength) between session				
Holistic assessment 3.3 Nurses should accomplish a foot risk assessment for diabetes people. This risk assessment includes the following: -History of previous foot ulcers -Sensation by testing with 10 g monoilament or vibration -Structural and biomechanical abnormalities -Circulation by testing foot pulse palpation -Self-care behaviour and knowledge (Refer to Appendix 2,3,4,5) **-Any risks : Chronic renal failure , poor glycaemia control, ageing, poor eyesight, malnutrition**				
3.4 People with diabetes **or caregivers** should be encouraged with self-monitoring and foot inspection				
Classification of risk factors 4.0 Based on assessment of risk factors, patients should be classified as: -lower current risk (normal sensation, palpable pluses) -at increased risk (neuropathy or absent pulses or other risk factor) -at high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcers) -foot ulcer				
Care of people at lower current risk 5.0 Nurses should discuss and agree with patients a management plan which consists of an appropriate foot care education programme so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm				
5.1 Patients who is at lower current risk should be reviewed annually				
Care of people at increased risk 6.0 Patients who are at increased risk should be referred to a foot protection team				
6.1 Patients who is at increased risk should be arranged to review 3-6 monthly by a foot protection team at review: -patient's feet inspection -review need for vascular assessment -footwear evaluation				
6.2 Patients who are at risk if developing foot such ulcers such as those with neuropathy should have enhanced foot care education and encouraged to undertake self foot care.				

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but improve	No Agree	
Care of people at high risk of foot ulcer 7.0 Patients who is at high risk of foot ulcer should be referred to a foot protective team				
7.1 Patients with high risk of foot ulcer should be frequent reviewed 1-3 monthly by a foot protection team at review: -patient's feet inspection -review need for vascular assessment And evaluate and provide appropriate: -intensified foot care education -specialist footwear and insoles -skin and nail care				
(Care of people wih foot ulcers) 8.0 A patient with a new foot ulcer should be urgently assessed by an appropriately trained health professional				
8.1 All patients with diabetic foot ulcers should be assessed for signs and symptoms of infection and facilitate appropriate diagonotic testing and treatment.				
8.2Record and assess a health history,allergies,medications, functional assessment and physical examination : neuropathy, vascular status, callus, infection, foot deformity/pressure ulcer including diabetes management				
Vascular assessment 8.3Assess vascular status at bilateral lower extremities for vascular supply and facilitate appropriate diagonotic testing				
8.4 Assess signs and symptoms of infection and facilitate appropriate diagnotic testing and treatment				
8.5Assess for autonomic, sensory and motor(S.A.M) changes in order to identify peripheral vascular problem				
8.6 Assess for deformities, foot pressure, gait, footwear and devices and facilitate appropriate referral				
8.7 Describe and identify the characteristics of the ulcer, identify the location, length, width, depth,assess ulcer bed, exudate, odour and peri-ulcer skin, and classify the ulcer. (Appendix G)				
8.8 Assess and optimise systemic, local and extrinsic factors that can influence wound healing.				
8.9 Provide wound care, debridement, infection control, a moist wound environment and pressure redistubution				
8.10 Individuals assessed as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment or to specialized diabetes or foot care treatment and education teams as appropriate.				

Statement	Opinion			Comment /suggestion
	Strongly Agree	Agree but have to improve	No Agree	
Appendix 2 ***Use of the Semmes-Weinstein Monofilament*** **Directions for use of Semmes –Weinstein Monofilament**คำแนะนำสำหรับการใช้ **Semmes-Weinstein Monofilament** The sensory test should be done in a quiet and relaxed site. 1. Assess integrity of monofilament (no bends/breaks).				
2. Show the monofilament to the patient. Place the end of the monofilament on his/her hand or arm to show that the testing procedure will not hurt.				
3. Ask the patients to turn his/her head and close his/her eyes or look at the ceiling.				
4. Hold the monofilament perpendicular to the skin. Monofilament Bend Release  Skin				
5. Place the end of the monofilament on the sole of the foot and NOT on an ulcer site, scar, callus or necrotic tissue. Ask the patient to say 'yes' when he/she feels you touching his/her foot with the monofilament. DO NOT ASK THE PATIENT, "did you feel that?" If the patient does not say 'yes' when you touch a given testing site, continue on to another site. When you have completed the sequence RETEST the area(s) where the patient did not feel monofilament				
6. Press the monofilament to the skin until it bends, and then hold for 1-3 seconds.				
7. Lift the monofilament from the skin. Do not brush or slide along the skin.				
8. Repeat the sequence randomly at each testing site on the foot (see pictures below). **Sites on the sole of the foot for monofilament testing** Loss of protective sensation = absent sensation at one or more sites.  Right Foot Left Foot **Notes** Apply only to intact skin. Avoid calluses, ulcerated or scarred areas. DO NOT use a rapid or tapping movement. • If the monofilament accidentally slides along the skin, retest that area later in the testing sequence. • Store the monofilament according to the manufacturer's instructions. Clean the monofilament according to agency infection control protocols.				

Appendix 3: Diabetes Foot Assessment/Risk Screening Guide

Use this guide to assess presence of potential risk factors for future foot ulceration and amputation.

Examine both feet and inquire about patient self-care practices.

Risk Factor	Yes	No	Opinion			Comment /suggestion
			Strongly Agree	Agree but have	Disagree	
1. Foot ulcer (a wound that took > 2 weeks to heal) now or in the past.						
2. Loss of sensation at any one site (determined after testing the 4 sites: great toe, first, third, and fifth metatarsal heads using the 10 Gram/5.07 monofilament).						
3. Callus present on soles of feet or toes or abnormal foot shape (claw or hammer toes, bunion, obvious bony prominence, Charcot's foot or joint).						
4.Pedal pulses (dorsalis pedis or posterior tibial) not palpable						
5. Claudication pain in tights and claves when prolonged standing. Pain relieved when at rest						
6. Abnormal fatigue foot muscle : cannot open or fold toe						
7.Patient unable to see the bottom of feet and/or unable to reach the bottom of feet and does not have someone who has been taught to perform appropriate foot care/inspection						
8. Poor fitting footwear (shoes too narrow or short, no toe protection, rough or worn interior, uneven wear on sole or heel).						
9. Patient **has not** received foot care education before ผู้.						
10. Patient **does not** check condition of feet most days, e.g., ask "How do you know if you have a reddened area or other problem with your feet?" or "How often do you check your feet?"						
11. Patient **does not** report foot problems to health care provider, e.g., ask, "What would you do if you found a blister on your foot?"						
12. Patient **does not** take steps to reduce risk of injury, e.g., ask if client walks bare foot in/outdoors, checks for foreign objects in shoes before wearing them, checks water temperature before entering a bath, etc.						
"Lower Risk" If a patient answers NO to any items 1-6, they are at "lower risk". / **"Increased Risk"** If a patient answers YES to items 2-3, they are at "increased risk". / **"Higher Risk"** If a patient answers YES to any items 2-6, they are at "higher risk". / **"Foot Ulcer"** If a patient answers YES to any items 1-6, they are at "Very high risk or foot ulcer".						
If the patients answers YES to **any items 7-12**, this indicates a self-care knowledge deficit and opportunity to enhance self-care knowledge and behaviour						

Appendix 4: ***(Structural and Biomechanical Abnormalities)***
1.Take off shoe and foot exam when standing, sitting and lying
2.Assess footwear and advise on the appropriate footwear for diabetic patients

	Right	**Left**	
Bony and soft tissue deformities including:			
□□Toe deformities (claw or hammer toes)			
□□Prominent metatarsal heads with inadequate soft tissue padding			
□□Hallux valgus (bunions)			
□□Bony Prominence			
□□ Partial foot Amputation			
□□BKA,AKA			
□□Charcot's joint (foot warm, swollen, red and painless during active phase)			
□□Blister			
□□Callus/Corn			
□□Fungal infection.			
□□ Other			

Opinion □ Strongly Agree □Agreed, but must improve □ disagree

Suggestion

Guideline for appropriate footwear evaluation (Modified from Nancarrow, 1999 and Canada Guideline 2008)

Item	Yes	No
1.The heel of the shoe is **1-1- 1** ½ inch (2.5 cm) (**the font 1 inch and back 1** ½ inch		
2.The shoes has adjustable laces or buckles, to hold shoes onto foot		
3 The length of the space between the tip of longest toe and the end of the shoe is **3/8 -1** inches when standing		
4. The shoes have a well-padded sole **and provide a cushion**.		
5.The shoes must cover the front of part of the feet and wrap around the heel to prevent possible injuries		
6. Shoe material is made of clothes and/or leathers which promote better air circulation and inhibit fungal growth.		
7. The shoe shape has the similar shape as the feet **and not fit or loose**.		
8. The back of heel counter of shoe is fit and firm.		
9. The width and the length of each shoe should be unequal because the size of each foot is naturally different.		
10.Location of the first metatarsals phalangeal should be located at the widest width of the shoe		
11. The area inside the shoes at the fore foot part and across the site of metatarsophalangeal joints should be wide and deep enough to promote the comfortable movement of the shoes.		

Evaluation :only 1 No answer is inappropriate footwear.
Opinion □ Strongly Agree □Agreed, but must improve □ disagree

Appendix 5 : Location and Palpation of Pedal Pulses

Dorsalis Pedis: To palpate pulse, place fingers just lateral to the extensor tendon of the great toe. If you cannot feel a pulse, move fingers more laterally

Posterior Tibial: To palpate pulse, place fingers behind and slightly below the medial malleolus of the ankle. In an obese or edematous ankle, the pulse may be more difficult to feel.

Note: To enhance technique: Assume a comfortable position for you and the patient. Place hand in position and linger on the site. Varying pressure may assist in picking up a weak pulsation. Do not confuse patient's pulse with your own pulsating fingertips. Use your carotid pulse for comparison, if needed.

Strongly Agree Agreed, but must improve disagree

Comment……

Suggestion ……

Appendix 6 The classification of four stage risk classification of the diabetic foot (Adapted from: Perters and Lavery,2001; IWGD,2007)

	Definition	**History**	**Sensation**	**Deformities**	**Circulation**	**Self-care knowledge**
Low risk (0)	No sensory	-	Normal	-	-	
At increased risk(1)	Sensory Neuropathy	-	Loss 1 point	+	Absent pulse	
At high risk(2)	Sensory Neuropathy plus deformity or peripheral vascular problem	-	Loss more than 1 point	+	Absent pulse	
Very high risk/previous foot ulcer(3)	Previous ulcer or lower extremity	+	Loss more than 1 point	+ / Amputation	Absent pulse	

Strongly Agree / Agreed, but must improve. disagree
Comment……

Suggestion

Appendix 7 Grading a diabetic foot ulcer

Grading a diabetic foot ulcer

The two systems below are commonly used to grade diabetic foot ulcers.
Meggit-Wagner Ulcer Classification
These grades are based on ulcer depth and don't consider infection or ischemia.
Grade 0—preulcerative lesions, healed ulcer, or bony deformity
Grade 1—superficial ulcer; no subcutaneous tissue involvement
Grade 2—full-thickness ulcer; may expose bone, tendon, ligament, or joint capsule
Grade 3—osteitis, abscess, or osteomyelitis
Grade 4—gangrene of toe
Grade 5—gangrene of foot
University of Texas Staging System
Under this system, a wound is assigned a stage based on the presence or absence of infection and ischemia, and a grade based on the depth of the wound. The higher the grade and stage, the greater the risk of amputation.
□□Stage A—clean wounds (lowest risk)
□□Stage B—nonischemic infected wounds
□□Stage C—ischemic noninfected wounds
□□Stage D—ischemic infected wounds
□□Grade 0—preulcerative or postulcerative lesion, completely epithelialized
□□Grade I—superficial wound, not involving tendon, capsule, or bone
□□Grade II—wound penetrating to tendon or capsule
□□Grade III—wound penetrating to bone or joint

Appendix 8 : Care Tips for the Feet

Did you know that having diabetes puts you at risk of developing complications such as foot ulcers?
Yearly exam needed
Have a health professional examine your feet at least once a year.
Find out if you have lower or higher risk feet.
Risk Factors for Foot Ulcers:
□□A previous foot ulcer
□□Loss of normal feeling in your feet
□□Abnormal shaped foot, including calluses, and bunions
□□Poor circulation to your feet

Managing your blood sugar is important for healthy feet – See your healthcare provider! Get complete diabetes education.

Protect your feet – Follow these simple guidelines:

1. Check your feet daily

- Look at your bare feet everyday for red areas, blisters or any open area. If you cannot do this yourself, have someone else check for you.
- Use a mirror to look for the bottom of feet. If you cannot see or have a trouble with your sight, ask for some help from your family.
- See your doctor or foot specialist right away if you find a problem!

2. Protect your feet - always wear shoes!

- Wear comfortable shoes that fit well, support your foot and are not too tight. Do not wear shoes that cause reddened or sore areas.
- See a specialist for footwear advice if you have a higher risk foot.
- Don't walk barefoot in/out the house
- Feel inside your shoes before putting them on each time to make sure the lining is smooth and there are no foreign objects
- Wear soaks at night time

3. Keep your skin clean and soft

- Wash your feet in warm, not hot water regularly, but do not soak them. Dry your feet well between your toes. Check that the water is not too hot before putting your feet in it.
- Use unscented creams/lotion. Rub a thin coat of skin lotion over the tops and the bottoms of your feet. Do not put cream between the toes.

4. Don't hurt yourself with nail clippers or razors

- Cut your nails straight across and file the edge with an emery board or nail file. Get help to cut your nails, if needed.
- Don’t cut calluses. See a local foot care clinic

Appendix 9 Guideline of choosing foot wears for neuropathy.

Characteristic	Appropriate foot wear	Reasoning
Normal foot	Can use every style	
Neuropathic foot	-Shoe not too tight or too loose -Sport shoe with moulded insole	Moulded insole reduce heel mean peak pressure, forefoot pressure
Neuropathic foot plus deformity -Claw toe -Hammer toes -Bunion	-Simple sandal has back strap with orthotic-arch support -Metatarsal pad -Pronator/ supinator wedge	Moulded insole
Neuropathic foot plus deformity and history of ulcer/ marked scarring	-Insole or moulded sandal -Sport shoe with moulded insole -Adjustable custom moulded shoe with moulded insole	
Charcot foot or unstable ankle	Custom mould shoe/boot with moulded insole and rigid rocker undersole	Custom mould shoe reduce the forefoot peak plantar pressure and restructure the force through plantar surface.

Note Open sandals are not recommended for patients with neuropathic foot
(From Apelqvist et al. 2008, Bus et al. 2008, Dahmen et al.2001, IWGDF 2007)

Appendix 6.1.3 Development of Recommendation

Recommendations were developed under the dual themes of foot care management and the systematic review of foot care management.

Patient Empowerment and Education

1.Patient Empowerment and Education	1.0 Effective care and decision making should be shared between patients and health care professionals.	*IV*
	1.1 All patients or caregivers should get an educationsl understanding of their condition and the resources available to optimise their general health, diabetes management and ulcer care.	*Ia*
	1.2 As part of ongoing foot care, patients should arrange recall and have perform on an annual review to detect risk factors for ulceration by trained personnel.	*IV*
	1.3 People who are older and have had diabetes for a long time, have poor vision, have poor footwear, smoke, live alone should be given vigilant care.	*III*

Evidence

Several clinical guidelines (ADA 2008, NICE 2004, IWGDF 2007, RNAO 2004) suggested that diabetic patients should get empowerment and foot education.

Education should be provided via several sessions over time, and preferably using a mixture of communication methods (IWGDF 2007).

Empowerment was the process as nurses should provide for the diabetic patient. (Sigurdardottir and Jonsdottir 2008). It is believed that empowerment in diabetic care is central to helping people discover and use their innate ability.

Empowerment in diabetic education through nurse- patient interaction promoted the diabetes management, especially patient's knowledge, confidence and foot self care (Corbett 2003).

There is evidence showing the effectiveness of empowerment in diabetic patients. Gibson (1995) mentioned that empowerment promoted patients to acknowledge their disease and health in order to make decisions and control and implement their resouces. The promotion of empowerment should incorporate a reflective approach with patients (Gibson 1995).

There is evidence upon which to base diabetic education, relating to diabetic knowledge, patients' condition and the resources available to diabetic patients and their caregivers (RNAO 2004). The main characteristic of educating the patients should participatory in nature, rather than didactic (RNAO 2004); fact to face intervention is the most effective (Fan and Sidani 2009).

It is reported that the older diabetic patients are at an increased risk of foot ulcers because they have a poor cognitive performance and eyesight impairment (Martinez and Tripp-Reimer 2005). This affects the functional status and daily activites in older diabetes sufferers.

Empowerment

Adolfsson et al. (2004) found that nurses and physicians were in conflict regarding the role of empowerment, with particular reference to implementingdiabetes' education. Nurses and physicians in five healthcare settings were interviewed. They provided feedback on the role of empowerment for diabetes care, in terms of an expert's role rather than a facilitator.

RNAO (2004) stated that people with diabetes should be reinforced by receiving basic foot education.

Educational intervention

RCT studies of Atak et al. (2008) evaluated the impact of an education programme targetting the empowerment and attitudes of diabetic patients. 80 diabetic patients were ramdomly allocated to either a control or intervention group. The education programme involved diabetic knowledge and self management behaviour which concentrated on monitoring blood glucose, hypoglycaemia and hyperglycaemia, diet management, exercise, complication management, footcare and the importance of medical care; all of which were taught for 1.5 hours to diabetic patients in the intervention group. The result of this study, measured by diabetes empowerment and attitude scales, indicated only limited improvement of patient empowerment. This study showed that education provided for only1.5 hours, that was evaluted in the second week after intervention, was not enough to improve diabetes empowerment

The RCT of Corbett (2003), which evaluated educational intervention involving foot care knowledge, recruited 40 home care patients from a Medicare-certified home health agency. Patients in the intervention group received individualised education about proper foot care. Patients in the intervention group were selected after receiving the baseline education two times at the first entry of study and 6 weeks later of the study. The findings showed that intervention increased patients' knowledge, confidence and reported foot care behaviours.

Discussion

There is a few evidence of empowerment in diabetes foot care (in Table 4.7) which supports the importance of empowerment in diabetic care, suggesting that empowerment would promote the innate ability of patients in their practiceof foot self care. The process of empowerment should encourage diabetic patients to be reflective about their problem of diabetic foot (Adolfsson 2004). Effective of empowerment of diabetic patients results in improved the diabetic management (Norris et al. 2002). WHO (Europe 2006) stated that strategies of patient and family empowerment would increase a patient's abilities regarding disease management, health behaviour adaptation, and using health care services more effectively. Moreover, it is aguable this positive inceement may also increase the coping skills and efficacy of the caregiver.

The older diabetic patient has a risk of developing foot ulcer complications and encountering difficulties with foot self care. To prevent foot complications, caregivers have an important role to support foot self care in older diabetic patients.

The evidence suggests knowledge about diabetic and foot care complications should be provided for all diabetic patients. It is also affirmed that patient knowledge can and does have an impact on disease management (Norris et al. 2002). Moreover, factors such as social support, self- efficacy and health belief have an impact on diabetic management.

Table 6.1.3 Evidence for empowerment in diabetic foot

Author, year	Sample and setting	Intervention	Result	Limitation
Adolfsson et al. 2004	Evaluate the implementation of empowerment diabetes education in nurses and physicians intervention group and control group	Empower diabetic education	The result showed a conflict in role. Nurses and physicians knew their role in the traditional approach but not with respect to the empowerment role	
Atak et al 2008	RCT- Intervention 40	A patients centred education program	Impact of education (the diabetes	Limitation of this study – use

	patients and control group 40 patients Pre post- test design Setting Type 2 diabetic patients	– 1.5 hours	empowerment scale), diabetes attitude questionnaire The result of this study demonstrated limited improvement.	intervention of education programme only 1.5 hour, post-test given in second week after intervention
Corbett 2003	A prospective randomised single centre, 2 groups design- 40 home care patients	First, 6 week later of individualised education	Measure foot care knowledge, self-efficacy, reported self-care practice	Patients knowledge, confidence and self-care behaviour increased

Continuing professional development

2. Continuing professional development	2.1 Nurses and other health care professionals, involved in the assessment of diabetic feet, should obtain adequate training.	*IV*

Evidence

The level of training health care provider affected to the potentialperformance of foot examinations undertaken by physicians in the study of O'Brien et al. (2003). An education programme was designed to be an intervention for physicians. The intervention phase consisted of multifaceted methods, such as promoting the importance of foot examinations via a monthly report session, a hand out distribution, and via a medical staff meeting. In addition, medical and clinical support staffs were encouraged to remove diabetic patients'socks and shoes and to remind such patients to remove their shoes and to placed them at the back door of the clinic.

The performance of diabetic foot examiantions increased dramatically at 3 months and 6 months, post intervention, after receiving the education intervention (O'Brien et al. 2003). Especially, education programmes that promoted the performance of proper foot examinations of patients, taking into account their characteristics.

In a two-group pre-post design study, 56 nurses and 25 podiatrists were randomised to either the training package group (n=41) involving two days training or the control group (n=40) (Jone and Gorman 2004). The findings showed that the training package, in the management of the diabetic foot, had a positive impaction on nurses' and podiatrists' knowledge and reported practice. The overall mean score in the experimental group increased significantly while the overall mean score in the control group changed but not significantly.

It is recommended that health care professionals must train adequately (NICE 2004). Nurses who are involved in foot care, need education regarding to how to perform neurological and vascular assessment. In addition, foot deformity should also be examined by nurses (Foster 2004).

Discussion

While the results of training to carry out proper foot examinations positively impacted the knowledge and performance of foot examinations procedures of nurses and health care providers, more research into of training courses or methods for health care providers is needed. It is argued that the foot care training shoud be provided for the multidisciplinary medical team; especially for nurses who are directly involved in foot care clinics (Jone and Gorman 2004).

The issue of foot examination should include the foot assessement, signs and symptoms of foot problems and treatment for foot problems (O'Brien et al. 2003, Jone and Gorman 2004). Moreover, the training time for a foot examination should be at least 2 days or more than. The importance of foot assessesment, from the perspective of social and psychological issues, should be emphasised and included in the foot education training programmes (Jone and Gorman 2004).

3. Foot examination and monitoring	3.1 Foot examination should contain -foot sensation testing with a 10g monofilament or vibration -foot pulse palpation -any foot deformity inspection -footwear inspection	*Ia*
	3.2 Monofilaments should not be used to test more than ten patients in one session and should be left for at least 24 hours to recover (bucking strength) between sessions.	*III*
Holisic assessment	3.3 Nurses should accomplish a foot risk assessment for diabetes people. This risk assessment includes the following: -History of previous foot ulcers -Sensation by testing with 10 mg monoilament or vibration -Structural and biomechanical abnormalities -Circulation by testing foot, pulse palpation -Self-care behaviour and knowledge	*IV*
	3.4 People with diabetes should be encouraged with self-monitoring and inspection.	*IV*

Evidence

Foot examination for diabetic patients composed of evaluating foot sensation, foot pulse, foot deformity and footware inspection (ADA 2008, IWGDF 2004, IDF 2007, NICE 2004).

It is recommended that sensory neuropathy should be tested with monofilament test, tunning fork test (IWGDF 2004, ADA 2008, IDF 2005, NICE 2004 and Dros et al. 2009) and cotton wool test (IWDGF 2004).

There is a suggestion of a longevity and recovery test that using each monofilament examine approximately 10 patients, the equipment will need a recovery time of up to 24 hours to restore the filament's bucking strength (NICE 2004).

Foot screening assessment should examine in the issues of feet deformity and skin condition, foot ulcer history or amputation, neuropathy, loss of joint mobility, foot pulses, and inappropriate footwear (IWGDF 2007).

Neuropathy test

The systematic review of Meyfield and Sugarman (2000) evaluated the 6 propective studies using the Semmes -Weinstein monofilament and four papers using vibration perception thresholds (VPT). The findings showed that the risk of ulceration increased from an odds ratio (OR) of 2.2 to 9.9 and amputation risk was related to using the SWM test; there was an increased odds ratio from 4.38 to 7.99 when using VPT. Research indicated that the benefit of an increasing risk helped promote early detection and foot ulcer prevention.

Dros et al. (2009) conducted the meta-analysis of the accuracy of the monofilament for diagnosed sensory neuropathy. Three studies included in systemic review and Dros and collegues investigated the ideas that accuracy of the monofilament test were rarely confirm defecting neuropathy in feet, although this test were used widely.

In a UK study, Abbott et al.(2005) assessed the screening of peripheral neuropathy, using the modified neuropathy score, disability score and monofilament in sentivity. A score > 6 identified moderate to severe neuropathy. 13,409 diabetic patients were recruited and defined in ethnic groupings as European, African Carribean and South Asian. The aim was to determine foot ulcer rates for each ethnic cohort and identify the differences of neuropathy and peripheral arterial disease (PVD) in order to alter ulcer risk.

Boulton et al.(2008) stated that the history of foot ulcer should be assessed asa risk factor component of a foot examination. History of foot examination components covered previous foot ulceration or amputation history, including neuropathic or peripheral vascular symptoms, visual impairment, renal replacement and cigaratte smoking.

The systematic review of Crawford et al.(2007) qualtified the predictive factors from diabetic patient's history in relation to foot ulceration. Five case control and eleven cohort studies were included in this analysis. The findings supported the view that physical signs and diagnostic tests can detect peripheral neuropathy, a major cause of diabetic foot ulceration. Detection of peripheral neuropathy was achieved by the use of monofilaments, an absent ankle reflex and biothesiometry, including detection of excessive plantar pressure. All detections were related significantly with diabetic foot ulcer in the future.

The study by Meijer et al.(2001) evaluated the screening and prevention programme of education for foot care. Fifty patients were randomly selected to be examined for risk factors, a procedure informed by Coleman's risk categorisation and the preventive measure scale in behaviour of foot care and foot care knowledge. The findings indicated that the scores of foot care knowledge and foot care behaviour were insufficient. The foot care behaviour scores were lower than the foot care knowledge scores. Moreover, protective footscores of shoe adaptation of patients were inadequate.

Footwear assessment

Ill fitting footwear causes foot ulcers in diabetic patients. Footwearthat is too small can induce constant localised pressure on the medial and lateral surfaces of feet. Shoes that are too large cause ulcer friction behind the heel, because of the foot sliding within the shoe. Furthermore, mismatched shoe sizes can disrupt the biomechanics of foot and ankle and cause foot pain and falls (Manna et al. 2001, Harrison et al. 2007).

Appropriate footwear releases the plantar pressure or prevents foot friction and therefore reduces the risk of developing a foot ulcer. Appropriate footwear was promoted to diabetic patients as a means to prevent foot ulcers. Therefore, footwear of diabetic patients is an essential issue in foot assessment and therefore patients' footwear should be examined regularly.

The randomised controlled trial of Litzelman et al. (1997) conducted a prospective evaluation of footwear characteristics as a predictor of foot ulcers. 352 diabetic patients were enrolled in this study and were assessed regarding foot wound (n=63) using the Seattle Wound Classification System. All patients were evaluated for their footwear style, material of indoor and outdoor shoes, sock fibres, appropriate length and width of shoes. The result of this study found that 50% patients wore tie – up shoes or loafer (slip on) type shoe. Most patients wore improperly sized shoes that were too narrow and/or too short. Indoor footwear was socks and slippers. The findings conclusion recommended that special shoes with appropriate length and width and type of socks were associated significantly with foot wounds.

Table 6.1.3.2 Diabetic foot examination

Inspection (Boulton et al. 2008 in UK and US)	IDF 2007/ IWGDF 2007	RNAO 2005	ADA 2004	FDUK 2008	Crawdford et al. 2007
-Dermatological					
• Skin status: colour, thickness, dryness, cracking	Y	n/a	Y	Y	
• Sweating	Y	n/a	Y	Y	
• Infection: check between toes for fungal infection	Y	n/a	Y	Y	
• Ulceration	Y	Y	Y	Y	
• Calluses/blistering: haemorrhage into callus	Y	Y	Y	Y	
History					
Past history	Y	Y	Y	Y	
Ulceration, amputation	Y	Y	Y	Y	
• Charcot joint	Y	Y	Y	Y	
• Vascular surgery				Y	
• Angioplasty	*Y			n/a	
• Cigaratte smoking	Y	Y	Y	Y	
Neuropathic symptoms	Y	Y	Y	Y	
• Positive (burning, shooting pain,electric or sharp sensation etc)	Y	Y	Y	Y	
• Negative (numbness, feet feel dead)			Y		
Vascular symptoms					
• Claudication	Y	Y	Y	Y	
• Rest pain	Y	Y	Y	Y	
• Nonhealing ulcer		Y	Y	Y	
Other diabetes complications			Y		
• Renal (dialysis, transplant)					
• Retinal (visual impairment)					
Musculoskeletal					
• Deformity e.g. claw toes, prominent metatarsal head, charcot joint	Y	Y	Y	Y -Bony deformation - Limitation in joint mobility	Y
• Muscle wasting (guttering between metatarsal)	Y	Y	Y		
Neurological assessement					
• 10 g monofilament +1 of the following 4	Y	Y	Y	Y	Y
• Vibration using 1280Hz tuning fork	Y	Y	Y	Y	Y
• Pinprick sensation	Y	Y			
• Ankle reflexes	Textile sensation *Not specifically described	n/a			Y
• VPT (vibration perception threshold)		n/a			Y
Vascular assessment		Y	Y	Y	
• Foot pulses		Y	Y	Y	
• ABI if indicated		Y	Y	Y	

	Appropriate footwear Bare foot walking	Y	Y	Y	
	Previous foot education	Y	Y		
	Fasting blood glucose Hb1Ac		Y	Fasting blood glucose Hb1Ac	Y

Discussion

There are many guidelines that suggest a sensory neuropathy test should incorporate a monofilament test and vibration tests (ADA 2008, IWGDF 2007, IDF 2005, Singh et al. 2005). There is strong evidence to show that sensory assessment should be assessed by both a 10 g Monofilament and vibration test, or another test, in order to diagnose sensory loss. Moreover, clinical dermatological assessment should also be practised in order to predict the possibility of future foot ulceration (Crawford et al. 2007).

Although the monofilament test was used in many guidelines, little has been reported about the accuracy of detecting neuropathy in feet (Dros et al.2009). Regarding validating neuropathy test, there is a suggestion by ADA (2008) and Dros et al. (2009) that a careful clinical examination, with more than 1 test, can be used to diagnose as the periphreral neuropathy,comprising, for example, a monofilament test, a tuning fork, pinprik and ankle reflexes (Dros et al.2009). It is recommended that testing pressure sensation using a 10 mg-monofilament should test at least the positon of the distal hallues.

There are many guidelines that recommend of footwear asessment (NICE 2004, RNAO 2004, IWGDF 2004). There is evidence that the vast majority of diabetic patients were wearing improper footwear that was either too short and/or too small; a situation that overtly increases the risk of a foot wound (Litzelman et al. 1999). Therefore, the characteristics of footwear should be assessed in diabetic patients in order to allow medical personnel to classify the risk of foot ulcer development. Footwear examiners should assess the inside-outside of each shoe,the inside-outside material of shoes, shoe width, shoe length, type of socks worn, whether the patients bought new shoes in the past 6 months and recommendations for special shoes from the health care provider (Litzelman et al. 1999, FDUK 2007).

4.Classification of risk factors	4.0 Based on assessment of risk factors, patients should be classified as: -lower current risk (normal sensation, palpable pulses) -at increased risk (neuropathy or absent pulses or other risk factor) -at high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcers) -foot ulcer	*III*

Evidence

In a control study, Peters and Lavery (2001) evaluated foot risk classification into four groups according to the international working group on the diabetic foot. The classification is as follows: group 0 (noperiphreral neuropathy), group 1 (PN and no deformity or periphreral vascular disease), group 2 (neuropathy and defermity or PVD) and group 3 (history of foot ulcer or amputation). 213 diabetic patients were recorded and evaluated in a follow up evaluation.

The findings showed that the risk classification prognosis of ulceration rates and amputation rates could be included as a tool to prevent diabetic foot complications.

The prospective study by Lavery et al. (2005) used the criteria for classification of low-risk and high risk patients in a 28 months prevention programe. After implementing the programme, there was a significant reduction of amputations and the length of stay, measured by hospital days.

Lavery et al. (2008) studied 1,666 diabetic patients who were subjected to foot assessment and who were followed up regularly. Modified versions of the International Working Group on the Diabetic Foot's risk classification were used to assess complications. This classification was adapted from the Texas foot risk classification. Modified risk classifications were: group 0 (no PN and no PAOD - peripheral arterial occlusive diseases), group 1 (PN, no PAOD, no deformity), group 2A (PN and deformity, no PAOD), group 3A (ulcer history) and group 3B (amputation). This classification predicted more diabetic foot complications than the original model. It can separate significantly more infections, amputations, ulcers and hospitalisations.

Discussion

Risk classification and stratification is a key to screening and disease management, in order to prevent diabetic foot complications (Peters and Lavery 2001). Classification of risk factors has been developed to prioritise high risk diabetic patients and facilitate diabetic foot assessment for prevention services. There are many types of risk classifications that are used to prioritise the risk status of diabetic patients and the level of attention given to each risk group. Those classifications inform the appropriate degree of foot care and prioritise the foot care needed from the hospital services. Furthermore, the benefit of risk classification is that it decreases the incidence of foot ulceration and foot amputation.

5.Care of people at lower levels of current risk	5.0 Nurse should discuss and agree with patients a management plan which consists of appropriate foot care education, so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm.	*II*
	5.1 Patients should be reviewed annually.	*IV*

Evidence

Diabetic patients should received an annual foot examination (ADA 2008, IDF 2005, IWGDF 2007, RNAO 2004) and also get general foot self care education (ADA 2008).

The lower risk level means patients who have normal sensation and palpable pulses, need to be educated about foot care (NICE 2004).

The systematic review of Valk et al. (2004) showed that diabetic patients with a high risk of foot ulceration benefit from regular foot care education and reinforcerment.

It is strongly recommendation in almost all guidelines that diabetic patients, who are without sensory loss and no neuropathy, should have their feet examined annually (ADA 2008, IWGDF 2007, IDF 2005, RNAO 2004).

It is recommended that patients with diabetes should receive a structured education for foot care (NICE 2004, FDUK 2008, IWGDF 2007).

The study of Lavery et al. (2005) evaluated the effectiveness of a diabetic foot disease management programme. The programme provided foot screening in neuropathy, peripheral vascular disease, foot deformity, foot pressure and history of lower extremities. Diabetic patients had their feet examined and were then classified into the low or high risk group; they were then educated using protocols of preventive or acute care. The results showed that the diabetic foot management programme diminished the incidence of amputation from 12.89 to

6.18 per 1000 diabetics per year. The admission number of foot problems decreased from 22.86 to 14.23 per 1000 diabetics per year. Moreover, the average length of an inpatient's hospital stay decreased from 4.75 to 3.72 days. It is claimed that the foot care management programme decreased foot complications, such as foot ulcer and foot amputation. For this reason it is strongly suggested that the programme will reduce the length of the patient's stay in hospital and will enhance and the skills of nurse after its implementation.

Discussion

People who have a low risk of diabetic foot ulcer experience sensory normality and/ or no deformity. This group should be provided with an annually foot examination. A foot examination is an essential step for preventing the development of foot ulcers in diabetic patients. Foot care education is essential for diabetic patients, as is the promotion of self-foot care, which prevents diabetic foot complications such as foot ulcers and foot amputations. Early detection and management of risk factors would delay or prevent adverse outcomes (ADA 2008). Moreover, diabetic patients should understand the implication of sensory loss and the crucial importance of daily foot care monitoring. It is recommended that encouraging diabetic patients to become involved in accessing knowledge about looking after their feet, as well as and understanding their physical abilities will enable them to conduct proper foot care (ADA 2008).

6.Care of people at increased risk of foot ulcer	6.0 Patients should be referred to a foot protective team.	*IV*
	6.1 Patients should be reviewed every 3-6 monthly by a foot protective team, to include a: -patient's feet inspection -review need for vascular assessment -footwear evaluation	*IV*
	6.2 Patients should receive foot care education and be encouraged to self care for their feet.	*IV*

Evidence

It is recommended that diabetic patients at an increased level of risks, who have a neuropathy problem but no deformity, should receive a foot examination from health care providers every 3-6 months or even every 1-6 months (NICE 2004, IWGDF 2007, RNAO 2005).

Patient's feet assessment should be encouraged by the health care providers (RNAO 2004, NICE 2004).

It is recommended that reducing the risk of foot ulceration can be achieved by increasing patient education on prevention and by wearing therapeutic footwear (Hunt 2009).

The study of Calle-Pascual et al. (2002) compared diabetic patients with and without compliance to a foot care programme between low risk and high risk groups. 308 diabetic patients were recruited for between 2 to5 years and were assessed against the compliance group, using VPT values. All diabetic patients received an identical foot screening and foot education. The compliance group received a foot care programme, while the noncompliance group received an educational programme. The foot education programme section was provided with four 120 minutes sessions in 1 week; their contents include: shoes, socks and clothes, foot care, nail care, the water temperature checks, the use of foot care products and foot warming devices, and foot and shoe inspection. The findings showed the incidence of foot ulcers at 33 ulcers in 28 patients (9 people in the low risk category and 8 of who were in the noncompliance group and 24 people in the high risk group and 19 foot ulcers whom were in the noncompliance group).

Most people who had the most foot ulcers were in the noncompliance group. It is concluded that the diabetic programme for foot care must be offered to diabetic patients in order to prevent the foot complications and delay the necessity to carry out a foot amputation.

Discussion

Patients who have increasing risk of a foot ulcer have a neuropathy problem without any deformity or peripheral vascular disease (NICE 2004). This group tends to have a higher risk of developing foot ulceration than any other group of diabetic patients from sensation loss. Therefore, daily feet inspections are necessary for patients. The incidence of loss sensation in diabetic patients is related to the duration of the individual's diabetic disease. Patients with a disease of long duration tend to suffer greater sensory loss or neuropathy. Screening for vascular disease and the related footwear is to prevent risks of occurring foot ulcers in patients with neuropathy. In addition, foot education of diabetic patients helps to reduce the incidence of foot ulcers and to promote appropriate foot care behaviour.

Table 6.1.3.3 content for diabetic foot care education

Content	NICE 2004	RNAO 2005	IWGDF 2007	FDUK 2008	Fritschi 2001	Calle-Pascual et al. 2002
Risk awareness of risk						
All diabetic patients should be educated about prevention and risk of foot problems	X	X	X	X	X	x
Monitor to detect problems early						
Inspect feet daily	X	X	X		X use the mirror or glass	x
Inspect for redness, dryness, break in skin, calluses	X colour change, swelling, breaks in the skin, pain or numbness)	X	X		X checked for blisters, sores, cuts and calluses	X
-Use appropriate first aid: wash cuts, scrapes, blisters gently with soap and water -Do not break blister		X				
Seek experienced professional help early	X	X	x notify the healthcare provider if a blister, cut, scratch or sore has developed	X	X notify when a problem arises: blisters, cuts, non-healing wound, infected sign, redness or swelling.	x
Care for feet properly, including skin and nails						
Keep feet clean	X daily washing	X				x
Dry thoroughly, including between toe	X careful drying	X	X			

Use moisturiser cream or lotion for dry skin – but not between toes	X	X	x lubricating oils or cream			Use foot care product
Don't soak (for more than 10 minutes) unless specified by health care practitioner		X		X don't stand or sit in one position for a long time		X
Don't use heater or a hot water to warm feet	X check bath temperature, avoid hot water bottles, electric blankets, foot spas, and sitting too close to fires	X	x water temperature, < 37 c	X don't sit too close to the fire or heater		X the use of foot warming device
Daily change of socks			x wearing of stockings with seams inside out or preferably without any seams		X wear always sock	X covering shoes, socks and clothes
Never wear tight or knee-high socks			x		Never wear garters, or when holes appear	
Cutting nails straight across	X nail care		x		Should not use sharp instruments or razor blades to self-treat foot problems such as ingrown toenails.	x
Corns and calluses should be cut by a health care provider	X dangers associated with practices such as skin removal (including corn removal)		x chemical agent or plasters should not be used to remove corn and calluses		X over the counter chemical agents to remove corns and warts should never be used.	x
Avoid trauma						
Daily inspection and check of the inside of the shoes	X help self-examination/monitoring: mirror	X ask for help to examinatio	X	X	x	x

		n				
Select proper footwear	x wear specialist footwear if has been supplied	X	X material for shoe	X welled padded shoe, Heel shoe is lesser than 2.5 cm -the length space between longest toe and the end of the shoe when standing is 1 cm. Material for shoe can be breathy -shoe is the same shape of feet -The heel counter of shoe is firm	X feet should be measured when buying the new shoe. Shoe should fit well and be broken in slowly	x
Avoid barefoot walking inside and outside the house	X		X	X	X	x
Seeking help from a healthcare professional if footwear causes difficulties and problem	X			X		x
	x Foot care on holiday -not wear new shoes -planning adequate rest periods to avoid additional stress on feet -when travelling by air, the importance of walk up and down aisles -use sunblock on feet -Have a first aid kit and covering sore places with a sterile dressing			X give up smoking -keep your leg elevated -keep blood glucose levels well controlled.		

7.Care of people at high risk of foot ulcers	7.0 Patients should be referred to a foot protective team.	*IV*
	7.1 Patients should receive a review every 1-3 months by a foot protective team that will deal with: -patient's feet inspection -review needed for vascular assessment And evaluate and provide appropriate: -intensified foot care education -specialist footwear and insoles -skin and nail care	*IV*

Evidence

Diabetic patients at high risk of foot ulceration should receive a foot examination every 1-3 months (IWGDF 2007, NICE 2004).

Ward et al.(1999) prospectively categorised patients with high risk as those who are insensate to monofilament test or who have a history of foot ulcers. Patients were followed for 3 months after the first session of educational intervention. 34 patients were educated to foot self examination of their feet, access proper footwear, conduct correct foot washing and were generally encouraged to look after themselves. The findings showed that knowledge and foot care behaviour significantly improved during the three months. Moreover, knowledge scores trended towards further improvement. Meanwhile, behaviour scores improved during the 3 months. In conclusion, education programmes improve foot care behaviour and knowledge of patients.

The systemic review of Valk et al (2004) commented that patient education promotes short-term knowledge and moderately reduces the risk of amputation and foot ulcer.

It is argued that foot deformities such as fixed hammer or clawtoe and hallux limitus, were associated with a high risk of the occurrence of foot ulcer (Ledoux et al. 2005, Boyko et al. 1999).

Appropriate footwear

Harrison et al. (2007) examined the reason for diabetic patients selecting inappropriate footwear. 100 diabetic patients were involved in the study and both their feet and footwear were examined. It was found that only one-third of patients wear appropriate footwear. Meanwhile, it was suggested that the reasons why diabetic patients did not choose appropriate footwear were a lack of footwear education or the poor availability of broader fitting shoes. Moreover, the lack of standardisation of shoe size was an added problem in shoe manufacturing.

Dahman et al. (2008) elicited a consensus of styles relating to therapeutic footwear for patients suffering from neuropathic foot. 44 experts were invited to contribute, via the postal Delphi technique, and 31 panel experts participated until the final round. The consensus about the neuropathic foot was reached when ten features of the condition were agreed upon,; as follows: the characteristics of shoes, loss of protective sensation, autonomic dysfunction, sensory dysfunction, limited joint mobility, hollow-claw foot, flexible flatfoot with hallux valgus, Charcot deformity, hallux amputation, forefoot amputation, and ulceration.

Viswanathan et al. (2004) evaluated the effect of different types of footwear insoles for use by the diabetic patients. 241 consecutive diabetic patients were enrolled in this study in a 2-month frame time and all had plantar pressure measured to identify their risk levels. A high risk group, whose members had a history of foot ulcers, was included in this study. Footwear styles comprised three- different kinds of insole related to neuropathy of diabetic patients: group 1-the MCR insole shoe, group 2- the polyurethane foam- insole footwear, group 3 patients with foot

deformity wear moulded footwear and group 4 –the sandal shoe because they declined the therapeutic shoe. Moreover, all patients were educated by being provided with foot care guidelines. After 9 months, the findings showed that patients who used the sandal shoe had a higher amount of new ulcers (33%) when compared with 4% of new lesions for those with the therapeutic footwear (Group 1, 2 and 3). It can be concluded that footwear with therapeutic insoles should be used to reduce the foot pressure in diabetic patients who have a foot deformity or history of foot ulcer.

Dicussion

Diabetic foot ulceration is caused from the sheer pressure directly onto feet. Patients, who have neuropathy, or vascular disease, or a foot deformity such as claw toe, tend to develop the future foot ulceration an, in extreme cases, foot amputation. Those patients who have neuropathy and deformity are 12.1 times more at risk of foot amputation than patients without neuropathy (Wu and Armstrong 2005).

It is strongly recommended that screening and prompt referral to foot care be provided (Hunt 2009, IWGDF 2007, RNAO 2005). Moreover, foot care education and therapeutic footwear should be encouraged for adoption by this group (Hunt 2009) although it is rarely evidence to support the effectiveness of this treatment.

Appropriate footwear is prescribed for diabetic patients in order to prevent the excessive plantar foot pressures, shear, and friction that cause foot ulcers, tissue damage and foot ulcer recurrence (McIntosh 2008, Bus 2008). The following can be brought out of Bus's (2008) work: athletic shoes/trainers are adequate footwear for use by diabetic patients with no foot deformity or who are in the lower risk category.

From the table 4.8, it can be seen that patients with neuropathy and deformity have 2.1 times more chance of developing foot ulceration than patients without such symptoms; while people with neuropathy, deformity and a history of ulcer and amputation have a 36 times greater risk of developing foot ulcers (Wu and Armstrong 2005). The main cause for developing a foot ulcer in a high risk individual was foot pressure from foot deformity. Therefore, patients who have neuropathy should receive the foot care education regarding appropriated footwear, which will serve to reduce the plantar foot pressure. Moreover, patient education concerning self-foot examination at home should provide the intensified foot care education.

8.Care of people with foot ulcers	8.0 A new foot ulcer patient should be immediately assessed by an appropriately trained health professional.	*IV*
	8.1 All patients with diabetic foot ulcers should be assessed for signs and symptoms of infection and receive appropriate diagnosis testing and treatment.	*Ilb-IV*
Holistic assessment	8.2 Record and assess a health history, allergies, medications, functional assessment and physical examination: neuropathy, vascular status, callus, infection, foot deformity/pressure ulcer including diabetes management	*Ib-IV*
Vascular assessment	8.3 Assess vascular status at bilateral lower extremities for vascular supply and facilitate appropriate diagnostic testing	*IIb-IV*
	8.4 Assess signs and symptom of infection and facilitate appropriate diagnostic testing and treatment	*IIa*
	8.5 Assess for autonomic, sensory and motor (S.A.M) changes in order to identify peripheral vascular disease	*II-IV*
	8.6 Assess for deformities, foot pressure, gait, footwear and devices and facilitate appropriate referral	*II-IV*
	8.7 Describe and identify the characteristics of ulcers, identify the location, length, width, depth, assess ulcer bed, exudate, odour and peri-ulcer skin, and classify the ulcer.	*Ia-IV*
	8.8 Assess and optimise systemic, local and extrinsic factors that can	*IV*

	influence wound healing.	
	8.9 Provide wound care, debridement, infection control, a moist wound environment and pressure redistribution	*Ia-III*
	8.10 Individuals assessed as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment or to specialised diabetes or foot care treatment and education teams as appropriate.	*IV*

Evidence

If a patient has a foot ulcer, he or she should examine the status of vascular assessment and foot care management. In a diabetic patient within a high risk group focus should be onsensory assessment, vascular assessment and wound assessment including vascular referral (IDF 2005).

The high risk group should arrange foot assessment reviews every 3-6 months by a foot care team (IDF 2005).

Management of the ulcerated foot is to promote wound healing and prevent amputation (FDUK 2008).

Infection control is to be a guideline to promote the wound healing in the treatment of diabetic ulcers (Steed et al. 2006).

Vascular assessment

Vascular status is important for diabetic patients with foot ulceration. There is a high risk of amputation of the lower extremity. It is recommended that palpation of the pulse should be evaluated at pedal pulse at dosalris pedis and posterior tibia position and be recorded (FDUK 2008, IWGDF 2007, NICE 2004, RNAO 2005).

Wound assessment

Wound assessment is necessary for guiding further therapy (IWGDF 2007). The standardised foot ulcer assessment is essential to guide further therapy (IWGDF 2007). The foot ulcer issues addressed in assessment are ulcer cause, ulcer type (neuropathic, ischaemic or neuro-ischaemic), ulcer status (area, slough, necrosis, callus, and pain), ulcer classification (site and depth, infection signs) and ulcer treatment (IWGDF 2007, FDUK 2008). Moreover, peripheral arterial disease and factors of wound healing are examined, in order to be able to define the wound healing process (FDUK 2008).

Wound treatment

It is recommended that a patient with foot ulcer should arrange urgent assessment for themselves within 24 hours, and referral to a foot care team, in order to treat the ulcerated foot (FDUK 2008, NICE 2004).

The RCT study of Akbari et al. (2007) evaluated the effectiveness between conventional therapy and vacuum-compression therapy. Randomised patients were selected into a control group and experimental group. The findings showed that wound healing in the experimental group, as measured by a foot surface, produced better healing when combined with appropriate conventional wound care (surgical treatment, debridement and wound cleaning).

Debridement

The debridement of a wound promotes the healing at 12-20 weeks (Smith et al. 2002). Their review evaluated 5 RCTs of debridement, in 418 diabetic people, for the effectiveness of debridement for diabetic foot ulcers. The review showed that using hydrogel in debridement significantly improved healing at 12 – 20 weeks, as compared with gauze dressing or standard wound care. Moreover, the review also found that there was no significant difference of healing rate between conventional ulcer management (relief pressure and dressing regularly) and

surgical debridement (surgical excision, eventual debridement, or bone segment removal underlying the lesion, and surgical closer). It is concluded that hydrogel in debridement is better at ulcer healing than standard wound care or gauze dressing.

It is recommended that dead tissue should be removed carefully to promote wound healing (NICE 2004, FDUK 2008). All necrosis should be removed using surgical, enzymatic, biological, mechanical, or autolytic debridement (Steed et al. 2006).

Discussion

The group of people, who have a history of foot ulcer or foot amputation, also have a high risk of experiencing foot ulcer recurrence. With those people there is not only a high likelihood of foot ulceration or foot ulcer recurrence but also most of them have a foot deformity, suffer loss of sensation or have peripheral vascular problems. The problem of peripheral vascular disease, and sensory neuropathy, is a major cause of a foot ulcer developing to the stage of the patient requiring foot amputation. High risk diabetic patients need neuropathy test, assessment of their vascular status and ankle brachial indexing including arterial perfusion, treatment or education for special footwear.

Foot ulceration is the main complication of diabetic patients and can develop to foot infection, which in turn may lead to amputation. Wound assessment was examined to promote wound healing. It is necessary to assess the vascular problem and neuropathy problem because these are the main causes of foot ulceration. Vascular assessment is important to detect the risk in a healthy foot and define the status of problem of foot ulcer. It can be concluded that vascular problems are a predictor of foot wound healing.

There is much strong clinical evidence to support the idea that ensuring regular wound and dressing change promotes wound healing (NICE 2004, Steed et al. 2006). Foot ulceration in diabetic patients should be assessed to establish wound healing potential, and the aspects of patient treatment (wound control, metabolic control, mechanical control, vascular control, microbiological control and educational control) (Hunt 2009).

Moreover, the positive effectiveness of debridement of diabetic foot ulcer has been reviewed (Smith 2002). The debridement of foot ulcer chosen in practice depends on the factors of patient acceptability, status of foot ulcer, treatment products available and professional skills (Smith 2002).

9. Patient empowerment and education	9.0 All diabetic people or caregivers should receive foot care education on an ongoing basis.	*Ib*
	9.1-Foot care education should be provided to all diabetes patients and reinforced at least annually.	*IV*
	9.2 Nurses in all practice settings should give and reinforce basic foot care education appropriately.	*IV*
	9.3 Patient education approaches should be varied until optimal methods appear to be identified in terms of desired outcomes.	*II*
	9.4 At the time of first diagnosis, structured patient education should be made available to all people with diabetes and then as required on an ongoing basis, based on a formal, regular assessment.	*IV*
	9.5 The basic foot care education for diabetic people should consist of the following elements: -Awareness of personal risk factors -Importance of at least annual inspection of feet by a health care professional -Daily self-inspection of feet -Proper nail and skin care -Injury prevention -When to seek help and specialised referral	*IV*

	9.6 Education should be modified to patient's current knowledge, individual needs, and risk factors. Principles of adult learning must be used.	*IV*

Evidence

It is recommended for the education for patients that the practitioner explains the reason for the foot examination and discusses the risk status of patients (IDF 2005, FDUK 2008). The patient-centre of foot care should be promoted to plan future care among nurses and patients (McIntosh 2007).

The minimum foot care recommended for diabetic patients; the care should provide the need for initiate referrals for expert review, patients to receive advice about the best action if a new ulcer occurs, basic education for foot care to prevent ulceration and advise the patient about appropriated footwear to minimise foot ulceration (FDUK 2008, IDF 2005).

The study in the US, by Ward et al. (1999), evaluated a diabetic foot education programme with a high risk group of veterans. The experimental pre-post test design of the multiple educational approaches was evaluated and provided by nurses. 34 patients received intervention involving with foot self-examination, foot washing, proper footwear and encouragement to maintain proper foot care. Before and after intervention, knowledge and satisfaction of care were measured. The finding showed that foot care knowledge and the level of satisfaction were improved from 14% to 33%.

Meijer et al. (2001) evaluated a programme of screening and prevention of diabetic foot complications. Risk profiles and the actual state of prevention of 50 patients were assessed, using a risk categorisation system. The findings showed that there were no significant differences between the preventive scores among the four risk categories.

Calle-Pascual et al. (2002) evaluated a preventive foot care programme with 220 diabetic patients in the difference stages of neuropathy. All diabetic patients were categorised into either the low risk or high risk group, based on each person's neuropathy disability score. The foot care programme was held over a week with four sessions of 120 minutes in total being provided. The issues included in the prevention programme were nail cutting, callus care, the water temperature check, walking barefoot, covering shoes, socks and clothes, foot hygiene care, the use of foot warming devices, bathroom surgery, methods of foot and shoe inspection and the use of foot care products. The programme of continuing foot care treatment provided regular monthly visits for at the first 6 months. Follow up through the next 3-6 years revealed the difference in foot ulcer incidence within group was an 8- and 22- fold lower risk of foot ulceration. In conclusion, the foot care programme decreased the incidence of foot ulcers in diabetic patients with neuropathy.

Johnson et al. (2005) investigated the patients' needs involving education of foot care. The qualitative study was conducted with 15 diabetic patients and included the being interviewed. The results found that patients realised the importance of the early education of foot care, as well as having knowledge of diabetes and complication prevention, including foot care knowledge. Moreover, patients would share their experience of diabetic care with the newly diagnosed patients. Patients at the first time of diagnosis might not receive or accept the information because of there being no symptoms or an unawareness of need for a change in life style.

Discussion

Foot care education should be provided early and frequently, based on a patient-centred model (Johnson et al. 2005). Although there is only limited evidence of valid and reliable knowledge of diabetic foot care in patients, diabetic patients' foot care knowledge needs to be taught those diabetic patients in order to explain the efficacy of foot care in patients with lower extremity

intervention, in order to prevent the development of foot complications (Martinez and Tripp-Reimer 2005).

10. Education of nurses	10.0 Nurses desire knowledge and skills in the following areas so as to competently assess a patient's risk for foot ulcers and provide the required education and referral: -Skills in conducting an assessment of the five risk factors -Knowledge and skill in educating patients -Knowledge of sources of local referral	*IV*
	10.1 Educational institutions should integrate Nursing Practice Guideline *Reducing Foot Complications for People with Diabetes* into the basic nursing education curriculum and provide continuing education programmes in this topic area.	*IV*

Evidence

It is essential for healthcare professionals and physicians to receive periodical education for improving care for patients in the high risk group (IWGDF 2007).

It is recommended that nurses require skills and knowledge of foot assessment in order to provide appropriate the patient education and referral (RNAO 2005).

Jone and Gorman (2004) evaluated the impact on knowledge of an educational training package and reported the practice of nurses and podiatrists in the field of diabetic foot management. 56 nurses and 25 podiatrists were randomly allocated to a control and experimental group in a pre-post test design. The training of the experimental group consisted of a 2 days programme before completing the post-test, whereas the control group did not receive the programme. The finding showed that the positive effective on practitioner's knowledge and reported practice as a result of their two day education programme.

Discussion

Nurses play the key role in foot examination and early treatment, in order to reduce diabetic foot complications. The role of a nurse is to prevent foot ulceration and foot amputation for diabetic patients. Therefore, knowledge of foot examination should be communicated to nurses or relevant health care providers (RNAO 2004) to support foot examination practice. The knowledge should include how to use assessment tool, how to evaluate neuropathy status, vascular status, and how to classify the risk and the resource for referral. Moreover, nurses should train to be skilled in the role of a patient's educator and teach those patients how to practice self-foot care.

Appendix 6.2 Questionnaire for Delphi Technique in Thai version

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คำชี้แจง

แบบสอบถามนี้ได้รับการพัฒนาเป็นส่วนหนึ่งของโครงการวิจัยค้นคว้าการดูแลเท้าเบาหวานในประเทศไทย การวิจัยใช้เทคนิค Delphi ซึ่งประกอบด้วยการส่งแบบสอบถามอย่างน้อย 2 รอบ เพื่อสอบถามความคิดของท่านเกี่ยวกับการจัดการของผู้ป่วยเหล่านี้และประสบการณ์ของการดูแลเท้าของท่าน

ในรอบแรกนี้มีวัตถุประสงค์เพื่อหาวิธีการดูแลเท้าผู้ป่วยโรคเบาหวานปัจจุบันในประเทศไทย. แบบสอบถามนี้ประกอบด้วยแนวทางการปฏิบัติเพื่อป้องกันการเกิดแผลที่เท้า การประเมินปัจจัยเสี่ยงเท้าและให้แนวทางในการพยาบาลผู้ป่วยโรคเบาหวาน. โปรดให้ความคิดเห็นของคุณในแต่ละข้อความและเหตุผลต่อความคิดเห็นของท่าน และข้อเสนอแนะจากประสบการณ์ของท่านต่อข้อความนั้นๆ ด้วยเพื่อประโยชน์ในการปรับปรุงแบบสอบถามในรอบต่อไป

หลังจากที่ท่านตอบแบบสอบถามนี้แล้ว ขอความกรุณาส่งแบบสอบถามดังกล่าวกลับตามที่อยู่ที่จ่าให้ตามหน้าของจดหมายที่แนบมาด้วย จักเป็นพระคุณยิ่ง

ชัสมน นามวงษ์

นักศึกษาปริญญาเอก

ชื่อแนวทางการปฏิบัติ:

Nursing Practice Guideline for foot care for diabetes Patients: Assessment and management of foot complication

แนวทางปฏิบัติการพยาบาลการดูแลเท้าสำหรับผู้ป่วยโรคเบาหวาน :การประเมินผลและการจัดการภาวะแทรกซ้อนของเท้า

หลักการและเหตุผล

โรคเบาหวานเป็นโรคเรื้อรังที่มีผลต่อคนทุกกลุ่มอายุทั่วโลก .องค์การอนามัยโลก (WHO) และ Wild et al. (2004) รายงานว่าในปี 2000 มีจำนวนคนเป็นโรคเบาหวานจำนวน 171 ล้านคนมีโรคเบาหวาน และก็ประมาณการณ์จำนวนคนที่เป็นจะเพิ่มอย่างน้อย 366 ล้านคนในปี 2030 โรคเบาหวานเป็นโรคเรื้อรังที่มีผลต่อผู้ป่วยทั้งทางร่างกายและทางจิตใจ ความผิดปกติของพยาธิสรีรวิทยาของคือการขาดหรือพร่องของอินซูลินซึ่งไม่เพียงพอต่อความต้องการของร่างกายมีผลให้ความเข้มข้นของระดับน้ำตาลกระแสเลือดเพิ่มขึ้น โรคเบาหวานแบ่งเป็นสองชนิด เบาหวานประเภทชนิดที่ 1 ที่มีการขาดอินซูลินเกิดจากมีการทำลายของ ß-cell ทำให้มีการหลั่งอินซูลินน้อยลงและเบาหวานประเภทที่ 2 ที่มีระดับอินซูลินปกติหรือสูงสาเหตุที่เป็นเบาหวานเพราะมีภาวะด้านต่ออินซูลิน insulin resistance ซึ่งโรคเบาหวานไม่เพียงมีผลกระทบต่อผู้ป่วยแต่ยังมีผลต่อทุกคนในครอบครัว.

การพัฒนาแผลเท้าเบาหวานเป็นปัญหาทั่วโลก ซึ่งกระทบต่อคุณภาพชีวิตของผู้ป่วย,ฐานะทางเศรษฐกิจ, อัตราความพิการ,อัตราการตาย และอัตราการตัดแขนขา (Wieman 2005). ในสหรัฐอเมริกาต้นทุนของการบริหารจัดการแผลที่เท้ามีค่าใช้จ่ายมากกว่าของต้นทุนค่าใช้จ่ายเกี่ยวกับการล้างไต (Wieman 2005). ภาวะแทรกซ้อนที่เท้าในโรคเบาหวานมักจะนำไปสู่การตัดแขนขาซึ่งจะเป็นการเพิ่มภาระในการดูแลทั้งระบบสุขภาพและครอบครัวผู้ป่วย. คุณภาพชีวิตของผู้ป่วยลดลงในขณะที่เพิ่มภาระครอบครัว จากงานวิจัยของ Riewpaiboon et al. (2007) พบว่า ค่ารักษาพยาบาลของการดูแลผู้ป่วยเบาหวานของไทยสูงและมีต้นทุนเฉลี่ยของการดูแลอยู่ที่ 6,331 บาท (หรือคิดเป็น158.28 เหรียญสหรัฐ) นอกจากนี้การมีแผลที่เท้าเบาหวานส่งผลกระทบเสียรุนแรงต่อการทำงานทางกายภาพ,สภาวะจิตใจและสถานะทางสังคม (Goodridge et al., 2005) ซึ่งกระทบต่อคุณภาพชีวิตของผู้ป่วยเบาหวานที่มีแผลที่เท้า เหมือนกับผู้ป่วยที่ถูกตัดขา(Willrich et al., 2005).

การป้องกัน ภาวะแทรกซ้อนของโรคเบาหวานเป็นปัจจัยสำคัญ เพื่อที่ช่วยลดค่าใช้จ่ายในการดูแลและอัตราการตัดแขนขาได้ และยังช่วยปรับปรุงคุณภาพชีวิต. การให้ความรู้ผู้ป่วยเบาหวานในการดูแลเท้า จึงเป็นสิ่งสำคัญที่จะลดอุบัติการณ์ของการเกิดแผลที่เท้า และอัตราการตัดขา โดยเฉพาะอย่างยิ่งการให้สุขศึกษารายบุคคล และมุ่งเป้าหมายเพื่อลดอัตราเสี่ยงการเกิดแผลที่เท้า (Reiber และ Raugi, 2005). การดูแลเท้าและโปรแกรมการป้องกันการเกิดแผลต้องการผู้นำอุทิศตัว และร่วมทำงานเป็นทีมของ ผู้ให้บริการดูแลสุขภาพ รูปแบบการวางแผนที่ดีระบบการดูแลที่หลากหลายและครอบคลุม

ขอบเขตของแนวการปฏิบัติ

ภาวะแทรกซ้อนของเท้าเบาหวาน ตลอดถึงการเป็นแผลเท้าเบาหวาน และ / หรือการตัดแขนขา

วัตถุประสงค์ของแนวการปฏิบัติ

-เพื่อระบุถึงข้อคำถามของวิธีการประเมินและจัดการผู้ป่วยที่ได้รับการวินิจฉัยของโรคเบาหวาน

-เพื่อให้ทิศทางการฝึกปฏิบัติพยาบาลผู้ให้การดูแลในทุกระดับของหน่วยการดูแลสุขภาพที่ให้การดูแลแผลที่เท้าในผู้ป่วยโรคเบาหวานประเภท 2

-เพื่อดำเนินการประเมินความเสี่ยงของแผลที่เท้าและให้การศึกษาขั้นพื้นฐานสำหรับป้องกันการเกิดแผลที่เท้าในผู้ป่วยเบาหวาน

-เพื่อให้การปฏิบัติการพยาบาลที่เหมาะสมในผู้ป่วยเบาหวานที่ได้รับการประเมินว่ามีความเสี่ยงสูงในการเกิดแผลที่เท้าหรืออัตราการถูกตัดขา

ประชากรเป้าหมาย

ผู้ที่เป็นโรคเบาหวานที่มีภาวะเสี่ยงต่อการเกิดภาวะแทรกซ้อนเป็นแผลที่เท้า

ประเภทของแนวการปฏิบัติ (GUIDELINE CATEGORY)

การให้คำปรึกษา (Counselling)

การบริหารจัดการ (Management)

การป้องกัน (Preventional

การประเมินภาวะเสี่ยง (Risk Assessment)

การประเมินผล (Evaluation)

CLINICAL SPECIALTY

Dermatology

Endocrinology

Family Practice

Internal Medicine

Nursing

Orthopedic Surgery

Physical Medicine and Rehabilitation

Pediatrics

Plastic Surgery

Podiatry

การประเมินความเสี่ยง และการป้องกันความเสี่ยง

1. การตรวจประเมินเท้าประจำปี

2. การประเมินปัจจัยเสี่ยงรวมถึงประวัติของ การมีแผลที่เท้าก่อนหน้านี้,การรับความรู้สึก, ความผิดปกติ biomechanical ,โครงสร้างและการไหลเวียนของเลือด ,และการดูแลตนเองและความรู้

3. การจัดแบ่งระดับความเสี่ยง

การจัดการ/การปรึกษา :การให้สุขศึกษากับผู้ป่วย

ผลลัพธ์ที่ถือเป็นหลัก :อุบัติการณ์ของแผลที่เท้าและอัตราการตัดขา (amputation)

คำอธิบายของวิธีการที่ใช้ในการวิเคราะห์หลักฐาน DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

วิธีที่ใช้ในการตั้งคำแนะนำ :ใช้เอกฉันท์จากผู้เชี่ยวชาญ

วิธีที่ใช้ในการประเมินคุณภาพ และจุดแข็งของหลักฐานเชิงประจักษ์ (METHODS USED TO ASSESS)

การให้น้ำหนักตามวิธีการด้านล่างตามการจัดลำดับคุณภาพของหลักฐานเชิงประจักษ์ (ชุดรูปแบบ กำหนด)

โครงร่างการจัดอันดับน้ำหนักและคุณภาพของหลักฐานเชิงประจักษ์

ระดับของหลักฐาน (Levels of Evidence)

Level Ia: หลักฐานที่ได้จากการศึกษา meta-analysis ของการศึกษาแบบกลุ่มสุ่มตัวอย่างแบบควบคุม (randomized controlled trials)ร่วมกับการได้รับความเห็นพ้องของผู้เชี่ยวชาญ (consensus)

Level Ib: หลักฐานที่ได้จากการศึกษาแบบสุ่มกลุ่มตัวอย่างอย่างน้อย 1 กลุ่ม (at least one randomized controlled trial)ร่วมกับการได้รับความเห็นพ้องของผู้เชี่ยวชาญ (consensus)

Level II: หลักฐานที่ได้จากการศึกษาแบบกลุ่มไม่ได้สุ่มตัวอย่าง-ควบคุมที่มีคุณภาพดีเยี่ยม อย่างน้อย 1 กลุ่ม (at least one well-designed controlled study without randomization หรือหลักฐานที่ได้จากที่ได้มีการศึกษาแบบเชิงทดลอง-ควบคุมที่มีคุณภาพดีเยี่ยมอย่างน้อย 1 ฉบับ(at least one other type of well-designed quasi-experimental study) ร่วมกับการได้รับความเห็นพ้องของผู้เชี่ยวชาญ (consensus)

Level III: หลักฐานที่ได้จากการศึกษาแบบพรรณา-ควบคุมที่มีคุณภาพดีเยี่ยม อย่างน้อย 1 กลุ่ม (well-designed nonexperimental descriptive studies) เช่น การศึกษาแบบเปรียบเทียบ (comparative studies),การศึกษาความสัมพันธ์ (correlation studies),และ แบบกรณีศึกษาเฉพาะราย (case studies) ร่วมกับการได้รับความเห็นพ้องของผู้เชี่ยวชาญ (consensus)

Level IV: หลักฐานที่ได้จากรายงานของคณะผู้เชี่ยวชาญ (expert committee reports) ประกอบกับความเห็นพ้องหรือฉันทามติ (consensus)บนพื้นฐานความคิดเห็นหรือประสบการณ์ทางคลินิกที่ได้รับการยอมรับอย่างมีระบบ

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

วิธีที่ใช้ในการวิเคราะห์หลักฐาน

ระบบการตรวจทานกับตารางหลักฐาน

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Part 2 Practice Recommendation

คำอธิบาย: โปรดอ่านข้อความเกี่ยวกับแนวทางในการดูแลเท้าสำหรับผู้ป่วยโรคเบาหวานในไทย
หลังจากนั้นโปรดเลือกว่าคุณคิดอย่างไรกับข้อความดังกล่าว เห็นด้วยไม่ต้องปรับปรุง เห็นด้วยต้องปรับปรุง หรือไม่เห็นด้วย . และโปรดให้ข้อเสนอแนะหรือสิ่งที่ต้องปรับปรุงจากความคิดเห็นหรือประสบการณ์ของท่านในข้อความที่ท่านไม่เห็นด้วยหรือเห็นว่าต้องปรับปรุงด้วย

ข้อความ	ความคิดเห็น			ข้อเสนอแนะ /สิ่งที่ต้องปรับปรุง
	เห็นด้วยไม่ต้องปรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
การให้ความรู้แก่ผู้ป่วยและเสริมแรงให้ผู้ป่วย (Patient Empowerment and education) 1.การดูแลที่มีประสิทธิภาพและการตัดสินใจร่วมกันระหว่างผู้ป่วยและทีมผู้ดูแลด้านสุขภาพ.				
1.1 ผู้ป่วยหรือผู้ดูแลควรจะได้รับข้อมูลสุขศึกษา: เข้าใจสภาพของการเจ็บป่วยและแหล่งข้อมูลที่สามารถเข้าถึงได้ เพื่อส่งเสริมภาวะสุขภาพทั่วไป, ประสิทธิภาพการจัดการของโรคเบาหวานและแผลที่เท้า				
1.2 ในส่วนของการดูแลเท้าอย่างต่อเนื่อง, พยาบาลและผู้เชี่ยวชาญด้านการดูแลสุขภาพที่เกี่ยวข้องควรตรวจประเมินเท้าของผู้ป่วยเป็นประจำทุกปีเพื่อประเมินหาปัจจัยเสี่ยงสำหรับการเกิดแผล				
1.3 ผู้สูงอายุที่เป็นโรคเบาหวานนาน, สายตาไม่ดี, สวมรองเท้าที่ไม่เหมาะสม, สูบบุหรี่หรือที่อยู่เพียงลำพังควรจะได้รับการดูแลอย่างรอบคอบเพื่อประเมินอาการที่ก่อให้เกิดแผลที่เท้า				
การพัฒนาความรู้ต่อเนื่องของวิชาชีพ (Continuing professional development) 2.1 พยาบาลและผู้เชี่ยวชาญด้านการดูแลสุขภาพที่เกี่ยวข้องในการประเมินเท้าเบาหวานควรได้รับการฝึกอบรมอย่างเพียงพอ.				
การตรวจแลติดตามการประเมินเท้า (Foot Examination and Monitoring) 3.1 การตรวจประเมินเท้าควรประกอบด้วย -การทดสอบความรู้สึกรับรู้ที่เท้าด้วย 10g monofilament หรือตรวจสอบการสั่นสะเทือน -การคลำชีพจรเท้า -การตรวจความผิดปกติเท้า -การประเมินรองเท้า				
3.2 ไม่ควรใช้Monofilaments ทดสอบกับผู้ประติดต่อกันมากกว่าสิบคนและควรพักอุปกรณ์อย่างน้อย 24 ชั่วโมงเพื่อให้คืนสภาพการแข็งงอของเส้นเอ็นระหว่างการตรวจ				
การประเมินแบบองค์รวม (Holistic Assessment) 3.3 พยาบาลควรประเมินความเสี่ยงของการเกิดแผลที่เท้าสำหรับผู้ป่วยเบาหวาน การประเมินความเสี่ยงควรประเมินสิ่งต่อไปนี้ -ประวัติการเคยมีแผลที่เท้า -การรับรู้ความรู้สึกด้วยการประเมินด้วย monofilament 10 มิลลิกรัมหรือการสั่นสะเทือน -โครงสร้างความผิดปกติของเท้าและ biomechanical -การไหลเวียนของเลือดโดยการทดสอบ palpation ชีพจรเท้า -พฤติกรรมการดูแลตนเองและความรู้ (โปรดดูภาคผนวกA, B, C, D, E)				
3.4 ผู้ที่มีโรคเบาหวานควรจะกระตุ้นให้ตรวจสอบเท้าด้วยตนเอง.				
Classify of risk factor 4.0 จากการประเมินปัจจัยความเสี่ยงผู้ป่วยควรได้รับการจัดระดับความเสี่ยงดังนี้: -ระดับความเสี่ยงต่ำ (การรับความรู้สึกปกติ pluses ชัดเจน) -ความเสี่ยงเพิ่มขึ้น (โรคระบบประสาทหรือ pulses ขาดหรือปัจจัยเสี่ยงอื่นๆ) -ความเสี่ยงสูง (โรคระบบประสาทหรือ pulses และขาดความผิดปกติหรือการเปลี่ยนแปลงผิวหรือ ulcers ก่อน) -แผลที่เท้า				

ข้อความ	ความคิดเห็น			ข้อเสนอแนะ /สิ่งที่ต้องปรับปรุง
	เห็นด้วยไม่ต้องปรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
การดูแลผู้ป่วยที่มีความเสี่ยงต่ำ (Care of people at lower current risk) 5.0 พยาบาลควรปรึกษาและตกลงกับผู้ป่วยวางแผนการจัดการซึ่งประกอบด้วยการดูแลเท้า ที่เหมาะสม เพื่อเพิ่มความรู้, สนับสนุนประโยชน์ของการดูแลตนเอง และลดอันตรายที่จะเกิดขึ้น				…… …… ……
5.1 ผู้ป่วยที่อยู่ในภาวะความเสี่ยงต่ำ at lower current risk ควรได้รับการประเมินเท้าเป็นประจำทุกปี				
การดูแลผู้ป่วยที่มีความเสี่ยงเพิ่มขึ้น(Care of people at increased risk) 6.0 ผู้ป่วยที่มีอยู่ในภาวะเสี่ยงเพิ่มขึ้น at increased risk ควรส่งต่อไปยังทีมผู้ดูแลเท้า				
6.1 ผู้ป่วยผู้ที่มีภาวะเสี่ยงการเกิดแผลเพิ่มขึ้น (at increased risk) ควรตรวจประเมินเท้าทุก 3-6 เดือนโดยทีมผู้ดูแลเท้า โดยทำการประเมินเกี่ยวกับ : -ตรวจประเมินเท้าอย่างละเอียด -ทบทวนความจำเป็นในการประเมินหลอดเลือด -ประเมินความพอดีและเหมาะสมของรองเท้า				
6.2 ผู้ป่วยที่มีความเสี่ยงต่อการเกิดแผลที่เท้าเพิ่มขึ้นเช่น มีภาวะปลายประสาทเสื่อม (Neuropathy) ควรให้คำแนะนำ และส่งเสริมให้ดูแลเท้าด้วยตนเอง				
การดูแลผู้ที่มีภาวะเสี่ยงการเกิดแผลสูง (Care of people at high risk of foot ulcer) 7.0 ผู้ป่วยที่มีภาวะเสี่ยงต่อการเกิดแผลสูง (at high risk of foot ulcer) ควรส่งต่อทีมการดูแลเท้าป้องกัน.				
7.1 ผู้ป่วยที่มีภาวะเสี่ยงต่อการเกิดแผลที่เท้าสูง (at high risk of foot ulcer) ควรตรวจสอบเท้าสม่ำเสมอทุก 1-3 เดือนโดยทีมป้องกันเท้า: -การตรวจเท้า -ทบทวนความจำเป็นในการประเมินหลอดเลือด และต้องประเมินและให้การดูแลที่เหมาะสม -ความรู้เกี่ยวกับการดูแลเท้า -รองเท้าเฉพาะสำหรับผู้มีปัญหาที่เท้า				
การดูแลผู้ที่มีแผล (Care of people wih foot ulcers) 8.0 ผู้ป่วยที่เริ่มมีแผลที่เท้า ควรได้รับการประเมินอย่างเร่งด่วนโดยทีมสุขภาพ				
8.1 ผู้ป่วยทุกคนที่มี ulcers เท้าเบาหวานควรประเมินอาการและอาการแสดงของการติดเชื้อและได้รับการตรวจวินิจฉัยโรคและการรักษาที่เหมาะสม.				
8.2 ประเมินและบันทึกประวัติสุขภาพ, การแพ้ยา, การตรวจทางด้านร่างกาย : ระบบปลายประสาทเสื่อม, ภาวะหลอดเลือด,ตาปลา Callus, การติดเชื้อ, ความพิการของเท้าหรือการลงน้ำหนัก รวมทั้งการจัดการโรคเบาหวาน				
การประเมินภาวะหลอดเลือด (Vascular Assessment) 8.3 การประเมินภาวะหลอดเลือดที่ขาสองข้าง โดยการประเมิน Vascular Supply โดยใช้วิธีทดสอบที่เหมาะสม (ภาคผนวก E)				
8.4 ประเมินอาการและอาการแสดงของการติดเชื้อและส่งเสริมให้ได้รับการตรวจวินิจฉัยและการรักษาที่เหมาะสม				
8.5 ประเมินการเปลี่ยนแปลงของ autonomic, sensory and motor(S.A.M) เพื่อระบุถึงปัญหาของระบบประสาทส่วนปลาย				
8.6 ประเมินความผิดปกติของเท้า แรงกดที่เท้า การลงน้ำหนัก รองเท้า และ อุปกรณ์เสริม พร้อมกับส่งต่อตามความเหมาะสม				
8.7 อธิบายและระบุลักษณะของแผล พร้อมระบุตำแหน่ง, ขนาดความยาว, กว้าง, ลึก, ประเมินลักษณะก้นแผล สารคัดหลั่ง กลิ่น ลักษณะผิวหนัง และการแบ่งประเภทแผล (ตามภาคผนวก G)				

ข้อความ	ความคิดเห็น			ข้อเสนอแนะ /สิ่งที่ต้องปรับปรุง
	เห็นด้วยไม่ต้องปรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
8.8 ประเมินและพิจารณาเกี่ยวกับปัจจัยภายในและภายนอกที่จะมีผลต่อการหายของแผล				
8.9 ให้การดูแลแผล debridement การควบคุมการติดเชื้อ,การให้ความชุ่มชื้นกับแผล และการลดแรงกดต่อแผล				
8.10 ผู้ป่วยที่มีภาวะเสี่ยงต่อการเกิดแผลสูง ควรได้รับการแนะนำถึง ความเสี่ยงของการเกิดแผลของตนเอง และควรส่งต่อไปทีมการดูแลเบื้องต้น เพื่อรับการประเมินการดูแลเท้าและให้คำแนะนำที่เหมาะสม				
Patient Empowerment and Education 9.0 ผู้ป่วยที่เบาหวานทุกคนหรือผู้ให้การดูแล (caregivers) ควรได้รับคำแนะนำการดูแลเท้าพื้นฐานอย่างต่อเนื่อง.				
9.1 การศึกษาการดูแลเท้าควรจะให้กับผู้ป่วยโรคเบาหวานและเสริมอย่างน้อยปีละครั้ง				
9.2 พยาบาลทุกหน่วยงานสาธารณสุขควรให้คำแนะนำการดูแลเท้า และเสริมความรู้การดูแลเท้าพื้นฐานได้อย่างเหมาะสม				
9.3 การให้ความรู้การดูแลเท้าในแต่ละคนควรใช้กลยุทธ์วิธีการที่แตกต่างกัน เพื่อให้ได้ผลลัพธ์ที่ต้องการมากที่สุด				
9.4 ครั้งแรกของการวินิจฉัยโรคเบาหวาน ผู้ป่วยทุกคนต้องรับความรู้เกี่ยวกับโรคเบาหวาน การดูแลเท้าอย่างมีโครงสร้าง และตามความจำเป็นที่ประเมินได้ (ตามภาคผนวก H)				
9.5 การดูแลเท้าการศึกษาขั้นพื้นฐานสำหรับผู้ที่มีโรคเบาหวานควรประกอบด้วย -ความตระหนักเกี่ยวกับปัจจัยเสี่ยงส่วนบุคคลในการเกิดแผลที่เท้า -ความสำคัญของการตรวจสอบประจำปีอย่างน้อยปีละครั้งโดย ผู้เชี่ยวชาญการดูแลสุขภาพเท้า -การตรวจเท้าด้วยตนเองทุกวัน -การดูแลผิวและเล็บที่เหมาะสม -การป้องกันบาดเจ็บ -การส่งต่อที่ต้องใช้ความชำนาญเป็นพิเศษเมื่อพบว่าต้องการความช่วยเหลือ				
9.6 การศึกษาควรใช้หลักการเรียนรู้แบบผู้ใหญ่ มีการปรับเปลี่ยนตามเหมาะสมตามความรู้เดิมของผู้ป่วย ,ความต้องการแต่ละคน และปัจจัยเสี่ยงของการเกิดแผล				
Education of Nurse 10.0 เพื่อความสมบูรณ์ต่อการประเมินความเสี่ยงการเกิดแผลที่เท้าในผู้ป่วยและให้การศึกษาและการส่งต่อ พยาบาลควรมีความรู้และทักษะในด้านต่อไปนี้ -ทักษะในการประเมินปัจจัยเสี่ยงทั้งห้าปัจจัย ตามภาคผนวก A -ความรู้และทักษะในการให้ความรู้ผู้ป่วย -ความรู้ของแหล่งของการส่งต่อในท้องถิ่น				
10.1 สถาบันการศึกษาพยาบาลหรือสถาบันสุขภาพควรเพิ่มแนวทางการพยาบาลเพื่อลดภาวะแทรกซ้อนเท้าสำหรับผู้เบาหวานในหลักการศึกษาพยาบาลและส่งเสริมให้เป็นโปรแกรมการศึกษาอย่างต่อเนื่องในหัวข้อนี้				

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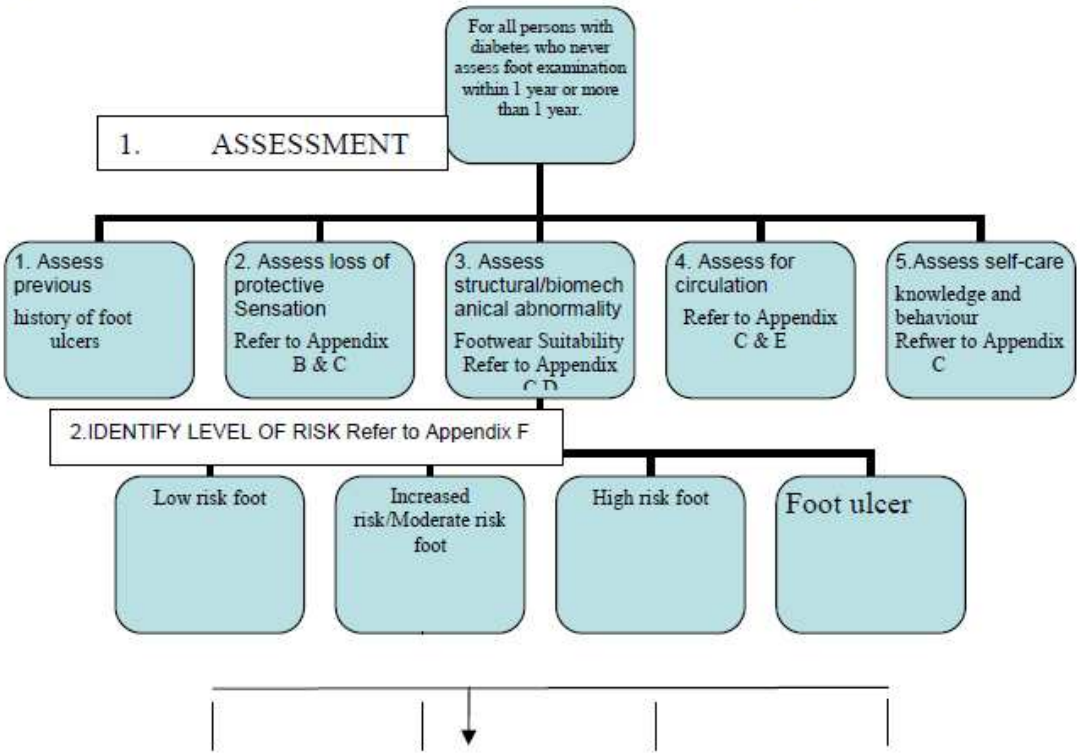
ภาคผนวก A

แนวทางการปฏิบัติการลดความเสี่ยงการเกิดแผลที่เท้า (Foot Care Risk Reduction Guideline)

พิจารณาเริ่มการประเมินที่ดีที่สุดแต่ละบุคคล โดยให้ความสำคัญกับปัจจัยเสี่ยงในปัจจุบันและให้การศึกษาที่เหมาะสมต่อปัจจัยเสี่ยงที่พบ

โดยประเมินของปัจจัยเสี่ยง 5 อย่างที่จำเป็นซึ่งสัมพันธ์กับความเสี่ยงของการเกิดแผลที่เท้า /การตัดขาควรทำอย่างน้อยปีละ 1 ครั้ง



ให้การศึกษาขั้นพื้นฐาน (ตามความต้องการและความเสี่ยงแต่ละราย)

- อธิบายความเสี่ยงของภาวะแทรกซ้อนของเท้าเนื่องจากการบกพร่องของการรับรู้ความรู้สึก, การไหลเวียน และความสัมพันธ์ของการควบคุมระดับน้ำตาลในเลือด
- ให้ความรู้เกี่ยวกับการดูแลตนเองกับผู้ป่วยและผู้ให้การดูแล และควรให้ข้อมูลระดับความเสี่ยงของผู้ป่วย การตรวจเท้าด้วยตนเองและทีมผู้เชี่ยวชาญ , การสวมรองเท้าป้องกัน, การดูแลเล็บและดูแลผิว
- ส่งต่อทีมให้ความรู้โรคเบาหวานหรือคลินิกผู้เชี่ยวชาญเกี่ยวกับเท้าเพื่อให้การศึกษาเพิ่มเติม

การส่งต่อ

- ตรวจสอบถ้าผู้ป่วยว่าได้รับการดูแลจากผู้เชี่ยวชาญด้านการดูแลเท้าแล้ว และเอื้ออำนวยการส่งต่อไปยังหน่วยการดูแลเบื้องต้นเพื่อประเมินเพิ่มเติมหรือส่งต่อเฉพาะไปยังทีมผู้ให้ความรู้และการรักษาการดูแลเท้าโรคเบาหวานตามความเหมาะสม.

ภาคผนวก C: แนวทางการประเมินความเสี่ยงของการแผลที่เท้าผู้เป็นเบาหวาน

คู่มือนี้ใช้ ในการประเมินสถานะของปัจจัยเสี่ยงที่อาจทำให้เกิดแผลเท้าและการตัดแขนขาในอนาคต.โดยตรวจสอบเท้าทั้งสองข้างและสอบถามเกี่ยวกับการปฏิบัติดูแลของผู้ป่วยเอง

Risk Factor ที่ประเมิน	Yes	No	ความคิดเห็น			ข้อเสนอแนะ/สิ่งที่ต้องปรับปรุง
			เห็นด้วยไม่ต้อง[illegible]	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
1. ปัจจุบันนี้หรือที่ผ่านมา มีแผลที่เท้า(แผลที่มีอยู่รักษา> 2 สัปดาห์เพื่อรักษา)						
2. สูญเสียความรู้สึกที่จุดใดจุดหนึ่ง (พิจารณาหลังจากทดสอบ 4 จุด: นิ้วหัวแม่เท้า นิ้วชี้ นิ้วกลาง และ fifth metatarsal head ใช้ 10 gram/5.07 monofilament						
3. มีบริเวณหนังหนา(callus)อยู่ที่ฝ่าเท้าหรือเท้าหรือรูปร่างเท้าผิดปกติ (เช่น., claw or hammer toes, bunion, obvious bony prominence, Charcot's foot or joint). โปรดระบุความผิดปกติของเท้า						
4. ชีพจรที่pedis dorsalis หรือ posterior tibial คลำได้ไม่ชัดเจนโดยพยาบาลและประวัติของการปวดขาและอาการปวดลดลงขณะที่พัก						
5. ผู้ป่วยไม่สามารถเห็นฝ่าเท้า ส้นเท้าและ / หรือไม่สามารถเอื้อมมือไปถึงด้านล่างของเท้าและไม่มีญาติหรือคนในครอบครัวที่ได้รับการสอนการตรวจและดูแลเท้าที่เหมาะสม						
6. ใส่รองเท้าที่ไม่เหมาะสม เช่น รองเท้าคับเกินไป หรือ แคบเกินไป รองเท้าส้น ไม่ปิดบริเวณนิ้วเท้า หรือพื้นรองเท้าฉีกขาด เรียบเกินไป						
7. ผู้ป่วยไม่เคยได้รับความรู้เรื่องการดูแลเท้ามาก่อน.						
8.ผู้ป่วยไม่ตรวจเท้าทุกวัน โดยถามว่า ท่านตรวจเท้าบ่อยแค่ไหน หรือท่านทราบได้อย่างไรว่ามีปัญหาเกิดที่เท้า						
9.ผู้ป่วยไม่บอกปัญหาที่เท้ากับทีมสุขภาพ เช่น ถามว่า ท่านทำอย่างไรถ้าพบว่าที่เท้ามีตุ่มน้ำขึ้นที่เท้า						
10. ผู้ป่วยไม่ได้ลดความเสี่ยงของการเกิดแผล เช่น เดินเท้าเปล่าในบ้านหรือนอกบ้าน หรือไม่สวมรองเท้าเดินในบ้าน และไม่ตรวจสิ่งแปลกปลอมในรองเท้าก่อนใส่ และตรวจสอบอุณหภูมิน้ำก่อนอาบ						
ถ้าผู้ป่วยตอบไม่มีในข้อที่ 1-4 ถือว่าเป็น "ระดับความเสี่ยงต่ำ" / ถ้าผู้ป่วยตอบ ใช่ ในข้อใดข้อหนึ่งในข้อ 1-4 ถือว่าระดับความเสี่ยงสูง						
ถ้าตอบ ใช่ในข้อใดข้อหนึ่งในข้อ 5-10 บ่งบอกว่าขาดความรู้ในการดูแลตนเอง และควรได้รับการส่งเสริมพฤติกรรมการดูแลเท้าด้วยตนเอง						

ภาคผนวก D: โครงสร้างและ Biomechanical ผิดปกติ *(Structural and Biomechanical Abnormalities)*

1.ถอดถุงเท้าและตรวจเท้าขณะที่ยืน นั่งและนอน

2.ตรวจประเมินรองเท้า และแนะนำรองเท้าที่เหมาะสมสำหรับผู้ป่วยเบาหวาน

	ขวา	ซ้าย	ความคิดเห็น
Bony and soft tissue deformities including: ☐☐Toe deformities (claw or hammer toes) ☐☐Prominent metatarsal heads with inadequate soft tissue padding ☐☐Hallux valgus (bunions) ☐ Bony Prominence ☐ Partial foot Amputation ☐☐BKA,AKA ☐☐Charcot's joint (foot warm, swollen, red and painless during active phase) ☐☐Blister ☐☐Callus/Corn ☐☐Fungal infection. ☐ Other			

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

.....

ข้อเสนอแนะ.....

แบบประเมินความพอดีและความเหมาะสมของรองเท้าผู้ป่วยเบาหวาน (ปรับปรุงจาก Nancarrow, 1999 and Canada Guideline 2008)

สิ่งที่ประเมิน	ใช่	ไม่ใช่
1.ส้นรองเท้าสูงน้อยกว่า 1 นิ้ว (2.5 ซม.)		
2.รองเท้าที่สวมใส่เป็นแบบผูกเชือก มีสายรัดที่สามารถปรับได้ เป็นรองเท้าที่หุ้มทั้งเท้า ไ		
3.ขณะที่ยืน มีช่องว่างระหว่างปลายรองเท้าถึงเล็บของนิ้วโป้งเท้าประมาณ 1-2 นิ้วฟุต.		
4.รองเท้ามีพื้นรองรับที่หนานุ่มรับแรงกระแทกได้ดี		
5.รองเท้ามีส่วนที่ปิดคลุมด้านหน้า และหุ้มเท้า เพื่อป้องกันการบาดเจ็บได้		
6.วัสดุที่ทำรองเท้าควรเป็นหนังหรือผ้า สามารถระบายอากาศได้ดี ป้องกันการเกิดเชื้อราได้		
7.รูปร่างรองเท้า มีลักษณะเดียวกับเท้า		
8.ส่วนหลังของรองเท้าบริเวณเหนือส้นรองเท้ามีความแข็งแรง ส้นเท้าพอดี ไม่คับหรือหลวมเกินไป		
9.ขนาดรองเท้าสองข้างทั้งความยาวและความกว้าง ขนาดของเท้าแต่ละข้างไม่เท่ากัน		
10.ตำแหน่งของข้อ metatarsalsophalangeal ที่ 1ควรอยู่ตรงกับตำแหน่งที่กว้างที่สุดของเท้า		
11.เนื้อที่ภายในรองเท้าในส่วนของเท้าส่วนหน้า (fore foot) และตามแนวขวางของ Metatarso-phalangeal joints ควรมีความกว้างและลึกพอประมาณ โดยที่ขยับนิ้วเท้าได้พอสมควร		

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

Comment.....

ข้อเสนอแนะ.....

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Appendix E : Location and Palpation of Pedal Pulses

ภาคผนวก E: ตำแหน่งและการคลำชีพจรPedal Pulses

Dorsalis Pedis: ในการสัมผัสชีพจร, วางนิ้วมือที่ด้านข้างที่เส้นเอ็นกล้ามเนื้อยืดของนิ้วเท้าใหญ่. หากไม่สามารถ
จับชีพจรให้เลื่อนมือขึ้นทางด้านข้าง

Posterior Tibial: ในการสัมผัสชีพจร, วางนิ้วมือด้านข้างค่อนไปด้านหลังใต้ตาตุ่มของข้อเท้า ในรายที่ผู้ป่วยอ้วนหรื
มีข้อเท้าบวม การคลำชีพจรอาจคลำยาก

. หมายเหตุ: เทคนิคการคลำ: จัดท่าให้ผู้ป่วยอยู่ในท่าที่สบายและสะดวกสำหรับผู้ตรวจ วางมือในตำแหน่งและขน
ไปกับผิวหนัง พร้อมออกแรงกดในการคลำอาจช่วยให้คลำชีพจรได้มากขึ้น จะไม่สับสนชีพจรของผู้รับการตรวจกับ
จรของผู้ตรวจ หรือยกกรณีจำเป็นอาจใช้ชีพจร carotid pulse ของผู้ตรวจเปรียบเทียบได้

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

ความคิ ดเห็น.....

ข้อเสนอแนะ.....

ภาคผนวก F การแบ่งระดับความเสี่ยงของการเกิดแผลเบาหวาน (ปรับปรุงมาจาก Perters and Lavery,2001; IWGD,2007)

	Definition	History	Sensation	Deformities	Circulation	Self care knowledge
Low risk (0)	No sensory	-	Normal	-	-	-Teach foot care -Foot exam yearly -Select comfortable foot
At increased risk(1)	Sensory Neuropathy	-	Loss 1 point	+	Absent Pluse	-Teach foot care -Foot exam every 3-6 months -never go barefoot -Soft insole -Exam feet daily
At high risk(2)	Sensory Neuropathy plus deformity or peripheral vascular problem	-	Loss more than 1 point	+	Absent Pluse	-Teach foot care -Foot exam every 1-3 months -never go barefoot -Many need Special foot wear , orthotics -Exam feet 1-2 times a day
Very high risk/previous foot ulcer(3)	Previous ulcer or lower extremity	+	Loss more than 1 point	+ / Amputation	Absent Pluse	-Teach foot care -Foot exam every 1-2 months -never go barefoot -Many need Special foot wear , orthotics -Exam feet 1-2 times a day

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

ข้อคิดเห็น.....

ข้อเสนอแนะ.....

Appendix G Grading a diabetic foot ulcer

ภาคผนวก G การแบ่งประเภทของแผลที่เท้าเบาหวาน

การแบ่งเกรดของแผลเท้าเบาหวาน Grading a diabetic foot ulcer

The two systems below are commonly used to grade diabetic foot ulcers. ทั้งสองระบบนี้จะใช้ทั่วไปในการแบ่งระดับแผลที่เท้าในเบาหวาน

ระบบการจำแนกของ Meggit-Wagner Ulcer Classification

These grades are based on ulcer depth and don't consider infection or ischemia.

Grade 0—preulcerative lesions, healed ulcer, or bony deformity

Grade 1—superficial ulcer; no subcutaneous tissue involvement

Grade 2—full-thickness ulcer; may expose bone, tendon, ligament, or joint capsule

Grade 3—osteitis, abscess, or osteomyelitis

Grade 4—gangrene of toe

Grade 5—gangrene of foot

University of Texas Staging System

Under this system, a wound is assigned a stage based on the presence or absence of infection and ischemia, and a grade based on the depth of the wound. The higher the grade and stage, the greater the risk of amputation.

☐☐Stage A—clean wounds (lowest risk)

☐☐Stage B—nonischemic infected wounds

☐☐Stage C—ischemic noninfected wounds

☐☐Stage D—ischemic infected wounds

☐☐Grade 0—preulcerative or postulcerative lesion, completely epithelialized

☐☐Grade I—superficial wound, not involving tendon, capsule, or bone

☐☐Grade II—wound penetrating to tendon or capsule

☐☐Grade III—wound penetrating to bone or joint

การแบ่งเกรดของแผลเบาหวานนี้ ในหน่วยงานของท่านเลือกใช้แบบไหน เพราะเหตุใด จากการใช้ของท่านมีปัญหาหรือไม่อย่างไร

ความคิดเห็น.....

ข้อเสนอแนะ.....

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ภาคผนวก H การดูแลเท้า

ท่านทราบหรือไม่ว่าโรคเบาหวานเพิ่มความเสี่ยงต่อการเกิดภาวะแทรกซ้อนของโรคเช่นแผลที่เท้า
ความจำเป็นของการตรวจประจำปี ต้องได้รับการตรวจเท้าโดยเจ้าหน้าที่อย่างน้อยปีละครั้ง เพื่อ**ค้นหาภาวะเสี่ยงต่อการเกิดแผลว่ามีภาวะเสี่ยงระดับใด** **ปัจจัยเสี่ยงของการเกิดแผลที่เท้า** ☐☐ ประวัติการมีแผลครั้งก่อน ☐☐ การสูญเสียการรับรู้ความรู้สึกของเท้า เช่น ชา ☐☐ความผิดปกติของเท้า การมีฝ่าเท้าหนา Callus and bunions ☐☐ การไหลเวียนของเลือดที่เท้าไม่ดี
การควบคุมระดับน้ำตาลในเลือดมีความสำคัญต่อสุขภาพเท้า พบกับทีมดูแลสุขภาพ และรับความรู้เกี่ยวกับการดูแลในโรคเบาหวาน

1.ตรวจเท้าทุกวัน

•ตรวจเท้าอย่างละเอียดของคุณทุกวันบริเวณขอกนิ้วเท้าว่ามีแผล รอยแดง ตุ่มน้ำ รอยแตก แผลเปิด ตาปลา หรือติดเชื้อราหรือไม่. หากคุณไม่สามารถทำเองมีคนอื่นตรวจสอบให้

•ส่องกระจกเพื่อดูด้านล่างของเท้า. ถ้าคุณไม่เห็นหรือมีปัญหาสายตาของคุณขอความช่วยเหลือจากคนในครอบครัว

•ถ้าพบปัญหาที่เท้าไปพบแพทย์หรือผู้เชี่ยวชาญเท้าของคุณทันที

2.ป้องกันเท้าโดยการสวมรองเท้าอยู่เสมอ

•สวมรองเท้าขนาดพอดี ไม่คับหรือหลวมเกินไป เหมาะสมกับรูปเท้า ทำจากวัสดุที่นุ่ม

•แบบรองเท้าควรเป็นรองเท้าหุ้มส้น ป้องกันอันตรายท่เท้า ไม่มีตะเข็บ หรือ มีตะเข็บน้อย มีเชือกผูก หรือมีสายรัดปรับได้
พื้นรองเท้านุ่ม ยืดหยุ่น

•หลีกเลี่ยงการสวมรองเท้าที่ทำด้วยยางหรือพลาสติก ป้องกันการเสียดสีเป็นแผล

•ห้ามสวมรองเท้าแตะแบบที่ใช้นิ้วเท้าคีบสายรองเท้า

•ไม่เดินเท้าเปล่าทั้งภายในและภายนอกบ้าน โดยเฉพาะพื้นผิวที่ร้อน เช่นหาดทราย พื้นซีเมนต์

•สำรวจรองเท้าภายในก่อนสวมใส่เสมอ เพื่อป้องกันสิ่งแปลกปลอมก่อให้เกิดแผลที่เท้า

•สวมถุงเท้าก่อนใส่รองเท้าเสมอ เลือกใช้ถุงเท้าที่ไม่มีตะเข็บ หรือกลับด้านในออก ควรเป็นถุงเท้าที่นุ่มซับเหงื่อได้
ไม่รัดแน่นจนเกินไป ควรเปลี่ยนถุงเท้าทุกวัน ถ้ามีอาการเท้าเย็นตอนกลางคืน ควรสวมใส่ถุงเท้า

3.รักษาความสะอาดของเท้า

•ล้างเท้าทุกวันและเวลาเท้าเปื้อน ด้วยน้ำสะอาดและสบู่อ่อน ทำความสะอาดตามขอกนิ้วและซับให้แห้ง

•ทาครีมหรือโลชั่นหลังจากล้างเท้าและซับให้แห้งทันที

•ห้ามแช่เท้าในน้ำร้อนหรือใช้อุปกรณ์ให้ความร้อน เช่นกระเป๋าน้ำร้อน ขวดแก้วใส่น้ำร้อน วางที่เท้า

•หากจำเป็นต้องแช่เท้า ต้องใช้น้ำอุ่น ต้องทดสอบอุณหภูมิก่อน โดยใช้ข้อศอกของผู้ป่วยทดสอบรับความร้อนของน้ำหรืออุปกรณ์ให้ความร้อนก่อนทุกครั้ง

4.ไม่ทำให้เกิดแผลจากการตัดเล็บ

•ตัดเล็บตามแนวตรง และตัดตามแนวขอบเล็บให้ปลายเล็บเสมอกับปลายนิ้ว และตะไบส่วนส่วนขอบเล็บ ห้ามตัดสั้นจนเกินไปและลึกถึงจมูกเล็บ ห้ามตัดเนื้อเพราะอาจเกิดแผลและมีเลือดออก

•ห้ามตัดตาปลาหรือเนื้อแข็งด้วยตนเอง รวมทั้งห้ามใช้สารเคมีใดๆลอกตาปลาด้วยตนเอง

Characteristic	Appropriate foot wear	Reasoning
Normal foot รายที่เท้าปกติ	Can use every style สามารถสวมรองเท้าได้ทุกแบบ	
Neuropathic foot	-Shoe not too tight or too loose รองเท้าที่ขนาดพอเหมาะ -Sport shoe with moulded insole รองเท้ากีฬา	Moulded insole reduce heel mean peak pressure,forefoot pressure(Windle wt al,1999)
Neuropathic foot plus deformity -Claw toe -Hammer toes -Bunion	-Simple sandal has back strap with orthotic-arch support รองเท้าที่มีสายคาดปรับได้ -metatarsal pad -pronator/ supinator wedge	Moulded insole
Neuropathic foot plus deformity and history of ulcer/ marked scarring	-Insole or moulded sandal -Sport shoe with moulded insole -Adjustable custom moulded shoe with moulded insole	
Charcot foot or unstable ankle	Custom mould shoe/boot with moulded insole and rigid rocker undersole	Custom mould shoe reduce the forefoot peak plantar pressure and restructure the force through plantar surface.(Beuker et al,2005)

Note Open sandals are not recommended for patients with neuropathic foot

(From Apelqvist et al, 2008;Bus,S et al,2008; Deursen et al,2008; Dahmen &Haspels,2004; IWDF, 2007)

แบบสอบถาม
แนวการปฏิบัติการพยาบาลสำหรับการดูแลเท้าในผู้ป่วยเบาหวาน ในประเทศไทย (ฉบับปรับปรุงครั้งที่ 1)

Nursing Practice Guideline for foot care for diabetes Patients

(Review Vertion 2)

พัฒนาขึ้นโดย
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คำชี้แจงเบื้องต้น

เรียน ผู้เชี่ยวชาญที่เกี่ยวข้องการร่วมให้ข้อคิดเห็นในแบบสอบถามนี้

สิ่งที่แนบมาด้วย 1.แบบสอบถามรอบที่ และรายงานค่า Agreement ของผู้เชี่ยวชาญในแบบสอบถามรอบที่ 1 (เอกสารสีเขียว)
2.คำชี้แจงการตอบแบบสอบถาม
3.แบบสอบถามรอบที่ 2 (หัวเอกสารหมายเลข 2 เอกสารสีขาว)

ขอขอบคุณผู้เชี่ยวชาญทุกท่านที่ร่วมให้ข้อคิดเห็นต่อแนวการปฏิบัติการพยาบาลการดูแลเท้าสำหรับผู้ป่วยเบาหวาน เพื่อให้บรรลุวัตถุประสงค์ของการวิจัย ผู้วิจัยขอชี้แจงการดำเนินการพัฒนาของแนวการปฏิบัติการพยาบาลนี้และขอชี้แจงแนวทางการตอบแบบสอบถามรอบสอง ดังนี้

1.ผลการดำเนินการพัฒนาแนวการปฏิบัติการพยาบาล ขณะนี้การดำเนินการพัฒนาอยู่ในช่วงส่งแบบสอบถามรอบที่สอง ขั้นตอนที่ 6

2.แนวทางการให้ความคิดเห็นต่อแบบสอบถามรอบที่สอง

ขอความกรุณาท่านได้อ่านคำชี้แจงเกี่ยวกับการตอบแบบสอบถามครั้งที่สอง (ฉบับปรับปรุงครั้งที่ 1)

แบบสอบถามเกี่ยวกับการพัฒนาแนวการปฏิบัติการพยาบาลรอบสองนี้ เป็นเอกสารที่ปรับปรุงหลังจากผลการประมวลข้อคิดเห็นของผู้เชี่ยวชาญดังที่แสดงใน รายงาน agreement เอกสารสีเขียว**ในข้อที่มี** Argreement **มากกว่า 70% ตามหลักการของ** Delphi Technique **จะไม่ได้ทำการแก้ไขปรับปรุงเนื้อหา แต่มีบางข้อคำถามที่ทำการปรับปรุงภาษาเพื่อให้เข้าใจได้ตรงกัน**

หลังจากท่านอ่านข้อความแบบสอบถามรอบที่สอง ขอความกรุณาท่านได้ลงความเห็นอีกครั้งในข้อความใหม่ที่ผ่านการแก้ไขแล้ว และหากท่านต้องการทบทวนว่าข้อความเดิมในรอบที่ 1 ท่านสามารถย้อนกลับดูได้ที่แบบสอบถาม รอบที่ 1 ที่ได้แนบมาให้ท่านเป็นข้อมูลประกอบการพิจารณาต่อความคิดเห็นในแบบสอบถามรอบสองครั้งนี้ด้วย

3. หลังจากการทำแบบสอบถามเกี่ยวกับแนวทางปฏิบัติการพยาบาล รอบสองนี้เสร็จสิ้น ขอความกรุณาท่านส่งกลับแบบสอบถามทุกชุดที่แนบมานี้ ขอความกรุณาท่าน ช่วยพิจารณาแบบสอบถามรอบสองนี้ภายใน 2 สัปดาห์ และส่งกลับคืนมายังที่อยู่ที่จัดให้หน้าซองนี้ไม่เกินวันที่ 20 สิงหาคม 2553 นี้ด้วย เพื่อให้แนวทางการปฏิบัติการพยาบาลนั้นมีความทันสมัย ด้วยจักเป็นพระคุณยิ่ง

อัสมน นามวงษ์
นักศึกษาปริญญาเอก
มหาวิทยาลัยดิมองฟอร์ด สหราชอาณาจักร

Part 2 Practice Recommendation

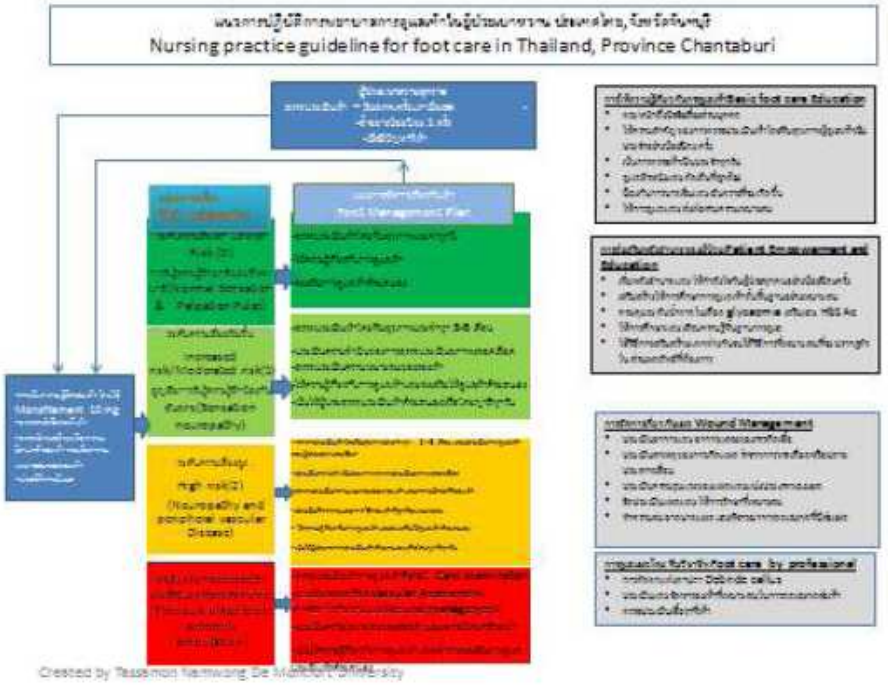
คำอธิบาย: โปรดอ่านข้อความเกี่ยวกับแนวทางการปฏิบัติการพยาบาลในการดูแลเท้าสำหรับผู้ป่วยโรคเบาหวานในประเทศไทย หลังจากนั้นโปรดเลือกว่าคุณเห็นด้วยไม่ต้องปรับปรุง เห็นด้วยต้องปรับปรุง หรือไม่เห็นด้วย . และโปรดให้ข้อเสนอแนะหรือสิ่งที่ต้องปรับปรุงจากความคิดเห็นหรือประสบการณ์ของท่านในข้อความที่ท่านไม่เห็นด้วยหรือเห็นว่าต้องปรับปรุงด้วย

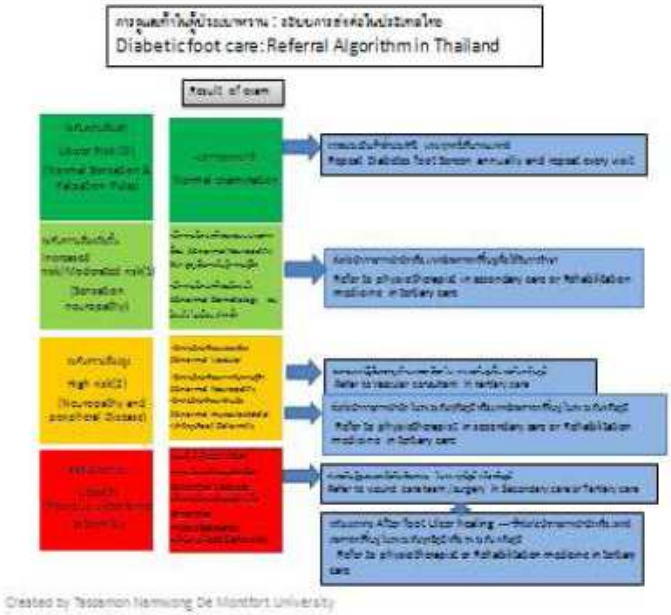
Statement ข้อความ	ความคิดเห็น			ข้อเสนอแนะ
	เห็นด้วยไม่ต้องปรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
การให้ความรู้และเสริมสร้างพลังอำนาจแก่ผู้ป่วยและผู้ดูแลอย่างต่อเนื่อง Patient and caregiver Empowerment and education 1.การดูแลที่มีประสิทธิภาพควรเป็นการตัดสินใจร่วมกันระหว่างผู้ป่วย ผู้ดูแลและทีมผู้ดูแลด้านสุขภาพ.(D)				
1.1ผู้ป่วยหรือผู้ดูแลควรได้รับความรู้เพื่อ เข้าใจในสภาพการเจ็บป่วยของตนเองและและสามารถเข้าถึงแหล่งข้อมูลและแหล่งประโยชน์ที่เสริมประสิทธิภาพการจัดการของโรคเบาหวานและแผลที่เท้า (Ia)				
1.2 เพื่อให้การดูแลเท้าอย่างต่อเนื่อง, พยาบาลและทีมผู้ดูแลเท้าควรจัดการและประเมินเท้าเป็นประจำอย่างน้อยทุกปี เพื่อประเมินหาปัจจัยเสี่ยงสำหรับการเกิดแผลตามความเสี่ยงที่ได้รับการประเมินในครั้งแรกของการตรวจรักษา(D)				
1.3 ผู้สูงอายุที่เป็นโรคเบาหวานนาน, ตามองเห็นผิดปกติ สวมรองเท้าที่ไม่เหมาะสม, สูบบุหรี่หรืออยู่บ้านคนเดียว ควรได้รับการประเมินตรวจเท้าและดูแลเท้าอย่างละเอียดและครบถ้วนเพื่อประเมินปัจจัยเสี่ยงที่อาจก่อให้เกิดแผลที่เท้า (C)				
1.4 (9.2) พยาบาลที่ปฏิบัติงานในสถานบริการสาธารณสุขทุกระดับหน่วยงานสาธารณสุขต้องให้ความรู้ในการดูแลเท้าและจัดการเสริมความรู้การดูแลเท้าให้กับผู้ป่วยและญาติได้อย่างเหมาะสม(IV)				
1.5 (9.3) การให้ความรู้ในผู้ป่วยแต่ละรายควรใช้กลยุทธ์วิธีการให้ความรู้การดูแลเท้าที่แตกต่างกัน เพื่อให้ได้ผลลัพธ์ตามที่ต้องการมากที่สุด(B)				
1.6(9.4) ผู้ป่วยเบาหวานที่ได้รับการวินิจฉัยโรคเบาหวานครั้งแรก ต้องได้รับความรู้เกี่ยวกับโรคเบาหวานตามความเสี่ยงต่อการเกิดแผลและตามข้อมูลพื้นฐานที่ประเมินได้ (ภาคผนวก 8)				
1.7(9.5) การให้ความรู้เบื้องต้นในการดูแลเท้าผู้เป็นเบาหวานประกอบด้วย (IV) -ความสำคัญกับปัจจัยเสี่ยงแต่ละบุคคลที่เสี่ยงต่อการเกิดแผลที่เท้า เช่น การควบคุมระดับน้ำตาลในเลือด -ความสำคัญของการตรวจเท้าอย่างน้อยปีละครั้งโดยทีมสุขภาพที่ดูแลสุขภาพเท้า -การตรวจเท้าด้วยตนเองทุกวัน -การดูแลผิวหนังที่เท้าและเล็บที่เหมาะสม -การป้องกันอุบัติเหตุอันตรายต่อเท้า -การประเมินอาการหรือความผิดปกติที่เท้าที่ต้องส่งต่อผู้เชี่ยวชาญ				
1.8(9.6) การให้ความรู้ควรยึดหลักการเรียนรู้แบบแบบผู้ใหญ่ ปรับเปลี่ยนรูปแบบตามเหมาะสม โดยคำนึงถึงความรู้เดิมของผู้ป่วย และความต้องการแต่ละคน รวมถึงปัจจัยเสี่ยงของการเกิดแผล (IV)				
การพัฒนาความรู้อย่างต่อเนื่องของวิชาชีพ (Continuing professional development) 2.1 พยาบาลและผู้เชี่ยวชาญด้านการดูแลสุขภาพที่เกี่ยวข้องในการประเมินเท้าและการดูแลเท้าเบาหวานควรได้รับการฝึกอบรมและฟื้นฟูความรู้ทุก 1 ปี (D)				
2.2(10.0) พยาบาลควรมีความรู้และทักษะในเรื่องการดูแลเท้าในเรื่องดังต่อไปนี้ (IV) -ทักษะในการประเมินปัจจัยเสี่ยงต่อการเกิดแผลที่เท้าทั้งห้าปัจจัย ตามภาคผนวก 1 -ความรู้และทักษะในการให้ความรู้ผู้ป่วย -ความรู้เกี่ยวกับสถานบริการด้านสุขภาพ ที่สามารถส่งต่อผู้ป่วยในชุมชนนั้นๆของแหล่งของการส่งต่อในท้องถิ่น				
2.3(10.1) สถาบันการศึกษาพยาบาลหรือสถาบันสุขภาพควรเสริมหลักสูตรในเรื่องแนวทางการปฏิบัติพยาบาลเพื่อลดภาวะแทรกซ้อนเท้าสำหรับผู้เป็นเบาหวานในการศึกษาทางการพยาบาล(IV)				

Statement ข้อความ	ความคิดเห็น			ข้อเสนอแนะ
	เห็นด้วยไม่ต้อง	เห็นด้วยแต่ต้อง	ไม่เห็นด้วย	
การตรวจและติดตามการประเมินเท้า Foot Examination and Monitoring 3.1 การตรวจประเมินเท้าควรประกอบด้วย (A) -ทดสอบความรู้สึกรับรู้ที่เท้าด้วย 10g monofilament หรือตรวจสอบการสั่นสะเทือน -การคลำชีพจรเท้า -ตรวจความผิดปกติเท้า (แบบประเมิน ภาคผนวก 4) -ตรวจประเมินรองเท้า (แบบประเมิน ภาคผนวก 5)				
3.2 ไม่ควรใช้Monofilaments ทดสอบกับผู้ป่วยติดต่อกันมากกว่าสิบคนและควรพักอุปกรณ์อย่างน้อย 24 ชั่วโมงระหว่างการตรวจเพื่อให้ความแข็งของของเส้นเอ็นคืนสภาพ (C)				
Holistic Assessment 3.3 พยาบาลต้องประเมินความเสี่ยงของการเกิดแผลที่เท้าสำหรับผู้ป่วยเบาหวาน ในหัวข้อดังต่อไปนี้(โปรดดูภาคผนวก 2, 3, 4, 5) (IV) -ประวัติการเคยมีแผลที่เท้า -การรับรู้ความรู้สึกด้วยการประเมินด้วย monofilament 10 มิลลิกรัมหรือสั่นสะเทือน -โครงสร้างความผิดปกติของเท้าและลักษณะ biomechanical รวมถึงความเหมาะสมของรองเท้า -การไหลเวียนของเลือดโดยการทดสอบ palpation ชีพจรเท้า -พฤติกรรมการดูแลตนเองและความรู้ -ประเมิน ความเสี่ยงอื่นๆ เช่น โลวามเครียด ควบคุมน้ำตาลไม่ดี อายุมาก สายตาไม่ดี ภาวะทุพโภชนาการ				
3.4 ผู้ที่มีโรคเบาหวานควรส่งเสริมกระตุ้นให้ตรวจสอบเท้าด้วยตนเองหรือ ให้ผู้ดูแลตรวจและดูแลเท้าทุกวัน (D)				
การจัดกลุ่มความเสี่ยง Classify of risk factor (C) 4.0 จากการประเมินปัจจัยความเสี่ยงผู้ป่วยควรได้รับการจัดระดับความเสี่ยงดังนี้: -ระดับความเสี่ยงต่ำ (การรับความรู้สึกปกติ pluses คลำได้และชัดเจน) ไม่มีปัจจัยเสี่ยงอื่น -ความเสี่ยงเพิ่มขึ้น (สูญเสียความรู้สึกของเท้าหรือ pulses คลำไม่ได้หรือมีหรือปัจจัยเสี่ยงอื่นๆ) -ความเสี่ยงสูง (สูญเสียความรู้สึกของเท้าหรือ pulsesคลำไม่ได้ และมีความผิดปกติหรือการเปลี่ยนแปลงผิวหรือ มีประวัติเป็นแผลที่เท้ามาก่อน) -แผลที่เท้า				
การดูแลผู้ป่วยที่มีความเสี่ยงต่ำ Care of people at lower risk 5.0 พยาบาลควรวางแผนและข้อตกลงกับผู้ป่วยเพื่อวางแผนการจัดการการดูแลเท้าที่เหมาะสมด้วยการเพิ่มความรู้ สนับสนุนประโยชน์ของการดูแลตนเอง และลดอันตรายที่จะเกิดขึ้น (B)				
5.1 ผู้ป่วยที่มีระดับความเสี่ยงต่ำ ควรได้รับการประเมินเท้าจากทีมวิชาชีพเป็นประจำทุกปีและได้รับการเสริมทักษะการดูแลตรวจเท้าเป็นประจำ				
การดูแลผู้ป่วยที่มีภาวะเสี่ยงเพิ่มขึ้น Care of people at increased risk 6.0 ผู้ป่วยที่มีภาวะเสี่ยงเพิ่มขึ้น ควรส่งต่อไปยังทีมผู้ดูแลเท้าแพทย์เฉพาะทางหรือทีมที่ดูแลเท้าเฉพาะ (D)				
6.1 ผู้ที่มีภาวะเสี่ยงเพิ่มขึ้นควรตรวจประเมินเท้าทุก 3-6 เดือนโดยทีมผู้ดูแลเท้า โดยทำการประเมินเกี่ยวกับ(D) : -ตรวจประเมินเท้าอย่างละเอียด -ประเมินความจำเป็นของการประเมินหลอดเลือด (Vascular Assessment) -ประเมินความพอดีและเหมาะสมของรองเท้า -ประเมินความรู้ในการดูแลเท้า				
6.2 ผู้ป่วยที่มีความเสี่ยงเพิ่มขึ้นต่อการเกิดแผลที่เท้าเช่น มีภาวะปลายประสาทเสื่อม (Peripheral Neuropathy) ควรให้คำแนะนำ และส่งเสริมให้ดูแลเท้าตนเอง (D)				
การดูแลผู้ที่ภาวะเสี่ยงต่อการเกิดแผลสูง (Care of people at high risk of foot ulcer) 7.0 ผู้ป่วยที่มีภาวะเสี่ยงสูงต่อการเกิดแผลสูงควรส่งต่อทีมผู้ดูแลป้องกันการเกิดแผลที่เท้า				

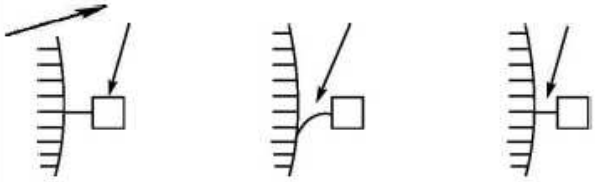
Statement ข้อความ	ความคิดเห็น			ข้อเสนอแนะ
	เห็นด้วยไม่ต้องรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
7.1 ผู้ป่วยที่มีภาวะเสี่ยงสูงต่อการเกิดแผลที่เท้า ควรตรวจสอบเท้าสม่ำเสมอทุก 1-3 เดือนโดยทีมผู้ดูแลเท้า ควรได้รับการประเมินดังต่อไปนี้: (D) -การตรวจเท้า (A) -ทบทวนความจำเป็นในการประเมินหลอดเลือด(D) -ความรู้เกี่ยวกับการดูแลเท้า -รองเท้าเฉพาะสำหรับผู้มีปัญหาที่เท้า -การดูแลผิวหนังและหลังเท้า				
การดูแลผู้ที่มีแผล (Care of people wih foot ulcers) 8.0 ผู้ที่เริ่มเป็นแผลที่เท้า ควรได้รับการประเมินจากทีมวิชาชีพดูแลเท้าและส่งพบแพทย์ทันที(D)				
8.1 ผู้ที่มีแผลเบาหวานที่เท้าทุกคน ควรตรวจประเมินสภาพแผล และอาการของการติดเชื้อ และได้รับการตรวจวินิจฉัยโรคและการรักษาที่เหมาะสม.(IIb-IV)				
8.2 ประเมินและบันทึกและประวัติสุขภาพ, (IIb-IV) • การแพ้, ยา, • การตรวจร่างกาย : ระบบปลายประสาทเสื่อม, ภาวะหลอดเลือด,ตาปลา Callus, การติดเชื้อ, ความพิการของเท้าหรือการลงน้ำหนัก รวมทั้งการจัดการโรคเบาหวาน • การออกกำลังกาย ประเภทของการออกกำลังกาย				
การประเมินภาวะหลอดเลือด Vascular Assessment 8.3การประเมินภาวะหลอดเลือดที่ขาสองข้าง โดยการประเมินการไหลเวียนของเลือดที่ไปเลี้ยงขาสองข้าง Vascular Supply โดยใช้วิธีทดสอบที่เหมาะสม(ภาคผนวก 5) **(IIb-IV)** • ตรวจประเมินการไหลเวียนของเลือดที่ไปเลี้ยงที่ขาสองข้าง Vascular Supply โดยใช้วิธีทดสอบที่เหมาะสม • ประเมิน Pluse และประเมินผล • ประเมิน ABI • ประเมินอาการและอาการแสดงของการขาดเลือด เช่นอวัยวะส่วนปลาย เล็บหนา ผิวบาง ขนร่วง อาการปวดน่องเวลาเดิน เท้าแดงเวลาห้อยขา เท้าซีดเวลายกขาสูง				
8.4 ประเมินอาการและอาการแสดงของการติดเชื้อของแผลและส่งเสริมให้ได้รับการตรวจวินิจฉัยและการรักษาที่เหมาะสม(IIa)				
8.5 ประเมินการเปลี่ยนแปลงของระบบประสาท autonomic, sensory and motor(S.A.M) เพื่อระบุถึงระบบประสาทส่วนปลาย(II-IV)				
8.6 ประเมินความผิดปกติของเท้า แรงกดที่เท้า การลงน้ำหนัก รองเท้า และ อุปกรณ์เสริม พร้อมกับส่งต่อเมื่อมีความผิดปกติตามความเหมาะสม (II-IV)				
8.7 อธิบายและระบุลักษณะของแผล พร้อมระบุ • ตำแหน่ง, ขนาดความยาว, กว้าง, ลึก, • ประเมินลักษณะก้นแผล • สารคัดหลั่ง กลิ่นdischarge • ลักษณะผิวหนัง • การแบ่งประเภทแผล (ตามภาคผนวก 7)				
8.8 ประเมินและพิจารณาปัจจัยภายในและภายนอกที่ส่งเสริมการหายของแผล				
8.9 จัดการดูแลให้แผลมีความชุ่มชื้น, ตบแต่งบาดแผล debridement ควบคุมการติดเชื้อ,ให้ความชุ่มชื้นกับแผล และลดแรงกดต่อแผล				
8.10 ผู้ป่วยที่มีภาวะเสี่ยงสูงต่อการเกิดแผล ควรได้รับการแนะนำถึง ความเสี่ยงของการเกิดแผลของตนเอง และควรส่งต่อไปทีมการดูแลเท้าเบื้องต้น เพื่อรับการประเมินการดูแลเท้าและให้คำแนะนำที่เหมาะสม				

ภาคผนวก 1 แผนภูมิแนวการปฏิบัติการพยาบาลการดูแลเท้าในผู้มีโรคเบาหวานในประเทศไทย





ภาคผนวก 2 แนวทางการตรวจโดยใช้ the Semmes-Weinstein Monofilament

ข้อความ	ความคิดเห็น			ข้อเสนอแนะ/
	เห็นด้วยไม่ต้องแก้ไข	เห็นด้วยแต่ต้องแก้ไข	ไม่เห็นด้วย	
การทดสอบประสาทสัมผัสควรจะทำในสถานที่เงียบสงบและผ่อนคลาย 1. ประเมินสภาพความสมบูรณ์ของ Monofilament (ไม่งอหรือแตก).				
2. อธิบายวิธีการตรวจโดยวางส่วนปลาย Monofilament ที่มือหรือแขนของผู้ป่วยให้รับรู้ว่าจะรู้สึกอย่างไร และแสดงว่าขั้นตอนการทดสอบจะไม่เจ็บ พร้อมบอกผู้ป่วยถึงวิธีการตรวจและการตอบของขณะทำการตรวจว่าให้ตอบว่ารู้สึกว่ามีเส้นเอ็นมาสัมผัสหรือไม่ หรือบอกตำแหน่งที่กำลังถูกตรวจ				
3.ขอให้ผู้ป่วยหันศีรษะหรือปิดตาหรือมองเพดานหรือไม่มองในตำแหน่งที่ทำการตรวจ นอนหรือนั่งทำสบาย				
4. ถือ Monofilament ตั้งฉากกับผิวในตำแหน่งที่ทำการตรวจแต่ละตำแหน่ง. Monofilament Bend Release Skin 				
5 ทำการตรวจแต่ละตำแหน่ง 3 ครั้งโดยไม่เรียงลำดับ ให้เป็นการตรวจจริง 2 ครั้งและตรวจหลอก 1 ครั้ง โดยถามว่ารู้สึกมี Monofilament มาแตะหรือไม่ ซึ่งไม่ต้องเรียงลำดับเหมือนเดิม				
การแปลผล ถ้าตอบรับได้ถูกต้อง 2 ใน 3 ครั้ง(รวมตรวจหลอกด้วย 1 ครั้ง)แปลว่า เท้ายังมี Protective sense อยู่ แต่ถ้าตอบได้ถูกต้องเพียง 1 ใน 3 ครั้ง หรือตอบไม่ถูกต้องเลย ให้ทำการตรวจซ้ำใหม่สุ่มตามตำแหน่งบนเท้า (ดูภาพด้านล่าง). ถ้าทำการตรวจซ้ำแล้วยังคงตอบรับได้ถูกต้องเพียง 1 ครั้งใน 3ครั้งหรือไม่ถูกเลยเช่นเดิม แสดงว่า เท้ามีการรับความรู้สึกผิดปกติ ทำการตรวจซ้ำสุ่มตามตำแหน่งบนเท้า (ดูภาพด้านล่าง). Sites on the sole of the foot for monofilament testing **ตำแหน่งฝ่าเท้าสำหรับการทดสอบ** monofilament Loss of protective sensation = absent sensation at one or more sites. สูญเสียความรู้สึกในการป้องกันอันตราย = การตรวจว่าไม่มีความรู้สึกในจุดที่ตรวจหนึ่งตำแหน่งขึ้นไป  Right Foot Left Foot Notes เพิ่มตำแหน่งตรวจนิ้วนาง หมายเหตุ • หาก monofilamentสไลด์ไปกับผิวอย่างไม่ตั้งใจ ให้ทำการตรวจสอบซ้ำอีกครั้ง • เก็บ monofilament ตามคำแนะนำของผู้ผลิต. ทำความสะอาด monofilament ตามวิธีการของแต่ละงานที่ควบคุมการติดเชื้อ.				
6. กด monofilamentลงบนผิวจนงอเป็นรูปตัว Cแล้วค้างไว้ 1-2 วินาที ดังภาพดังกล่าวข้างบน				

7. หลีกเลี่ยงการตรวจในตำแหน่งตำแหน่งฝ่าเท้าที่มีแผล, แผลเป็น, ตาปลา หนังหนาหรือที่มีเนื้อตาย.ในการตรวจแต่ละตำแหน่งที่ทำการตรวจให้การแต่ละตำแหน่งที่ทำการตรวจ ให้ทำต่อไปจนครบทุกตำแหน่ง ไม่จำเป็นต้องเรียงตำแหน่งและทำการตรวจซ้ำในตำแหน่งที่ไม่รู้สึก.				
8 ยก monofilament ขึ้นจากผิว. โดยไม่ปัดหรือลิลต์ไปตามผิว ไม่ควรใช้Monofilaments ทดสอบกับผู้ป่วยติดต่อกันมากกว่าสิบคนและควรพักอุปกรณ์อย่างน้อย 24 ชั่วโมงระหว่างการตรวจเพื่อให้ความแข็งของเส้นเย็นคืนสภาพ				

ภาคผนวก 3: แนวทางการประเมินความเสี่ยงของเท้าผู้ป่วยเบาหวานเท้า Diabetic Foot Assessment Risk Screening Guide

การใช้แบบประเมินนี้ ให้พยาบาลเป็นผู้ประเมินโดยสอบถามผู้ป่วยเกี่ยวกับข้อความความเสี่ยงที่ระบุไว้ในข้อความแต่ละข้อ และให้ระบุข้อมูลว่าพบหรือไม่พบในผู้ป่วยแต่ละราย

Risk Factor ที่ประเมิน				ความคิดเห็น			จัดอันดับความสำคัญของการประเมิน
				มี	ไม่มี	เห็นด้วยไม่ต้องปรับปรุง	เห็นด้วยแต่ต้องปรับปรุง	ไม่เห็นด้วย	
1. มีรอยโรคผู้ป่วยยังมีแผลที่เท้าอยู่ หรือเคยมีแผลที่เท้า ที่ใช้เวลาในการหายมากกว่า 2 สัปดาห์									
2. มีภาวะสูญเสียความรู้สึกในการป้องกันตั้งแต่หนึ่งจุดขึ้นไป (พิจารณาหลังจากทดสอบ 4 จุดที่ตำแหน่ง: นิ้วหัวแม่เท้า นิ้วชี้ นิ้วกลาง และ นิ้วก้อยโดย ใช้Monofilament No.5.07 ของ semmer – weinstein ขนาดแรงกด 10 gram									
3. ที่ฝ่าเท้ามีความผิดปกติดังต่อไปนี้ ก.หนังหน้าหรือ ตาปลา(cullus) ข.เท้าหรือรูปร่างเท้าผิดปกติ ได้แก่รูปเท้างอเป็นรูปเล็บเหยี่ยว claw or hammer toes, bunion, obvious bony prominence, Charcot's foot or joint). โปรดระบุความผิดปกติของเท้า..... ค.ความผิดปกติของผิวหนัง ได้แก่ ผิวแห้งแตก ส้นเท้าแตก ผิวหนังตึง ไม่มีขน เล็บหนาตัว '									
4 คลำ ชีพจรที่ dorsalis pedis หรือ posterior tibial ได้ไม่ชัดเจน									
5 มีประวัติของ Claudication ได้แก่ อาการปวดน่อง การปวดขาเมื่อยืนนานๆ และอาการปวดลดลงขณะพัก									
6.ความผิดปกติกล้ามเนื้อของฝ่าเท้าอ่อนแรง การทดสอบการกางหุบนิ้วไม่ได้									
7.ผู้ป่วยไม่สามารถตรวจเท้า หรือเห็นฝ่าเท้า ส้นเท้าและ / หรือด้านล่างของเท้าได้ด้วยตนเองและมีญาติหรือผู้ดูแลที่ตรวจเท้าให้									
8.รองเท้าที่ใส่ไม่เหมาะสม เช่น รองเท้าคับเกินไป หรือ แคบเกินไป รองเท้าส้น ไม่ปิดบริเวณนิ้วเท้า หรือพื้นรองเท้าฉีกขาด เรียบเกินไป หรือเป็นรองเท้าหูคีบ									
9. ผู้ป่วยไม่เคยได้รับคำแนะนำหรือความรู้เกี่ยวกับเรื่องการดูแลเท้ามาก่อน.									
10. ผู้ป่วยไม่ได้ตรวจเท้าทุกวัน โดยสอบผู้ป่วยว่า ท่านตรวจเท้าบ่อยแค่ไหน หรือท่านทราบได้อย่างไรว่ามีปัญหาอื่น ๆ เกิดที่เท้า									
11. ผู้ป่วยไม่สามารถบอกลักษณะปัญหาที่เกิดกับเท้ากับและทีมสุขภาพสอบถามวิธีแก้ปัญหา เช่น ถามว่า ท่านทำอย่างไรถ้าพบว่าที่เท้ามีตุ่มน้ำพองขึ้นที่เท้า เมื่อมีปัญหาเกิดขึ้นที่เท้า ผู้ป่วยไม่สามารถระบุบอกว่ามีปัญหาที่เท้าได้									
12. ผู้ป่วยเดินเท้าเปล่าในบ้านหรือนอกบ้าน หรือไม่สวมรองเท้าเดินในบ้าน และไม่ตรวจสิ่งแปลกปลอมในรองเท้าก่อนใส่									
ถ้าตอบไม่มีในข้อที่ 1-6 ถือว่าเป็น "ระดับความเสี่ยงต่ำ"	ถ้าตอบมีในข้อ 2 หรือ 3 ถือว่าเป็นระดับความเสี่ยงเพิ่มขึ้น	ถ้าตอบว่ามีในข้อ2-6 ถือว่ามีระดับความเสี่ยงสูง	ถ้าผู้ป่วยตอบ ใช่ ในข้อ 1-6 ถือว่าระดับความเสี่ยงสูงมาก และมีแผล						
ถ้าตรวจพบว่ามีความเสี่ยงในข้อใดข้อหนึ่งในข้อ 7-12 บ่งบอกว่าขาดความรู้ในการดูแลตนเอง และควรได้รับการส่งเสริมพฤติกรรมการดูแลเท้าด้วยตนเอง									

ภาคผนวก 4: แบบประเมินรูปร่างความผิดปกติของเท้า *(Structural and Biomechanical Abnormalities)*

1.ถอดถุงเท้าและตรวจเท้าขณะที่ยืน นั่งและนอน

2.ตรวจประเมินลักษณะเท้าของผู้ป่วยเพื่อแนะนำรองเท้าที่เหมาะสมสำหรับผู้ป่วยเบาหวาน

ลักษณะความผิดปกติ Bony and soft tissue deformities	ขวา		ซ้าย		ภาพประกอบ
	มี	ไม่มี	มี	ไม่มี	
1.รูปร่างเท้าผิดปกติFoot Deformities • Toe deformities (claw or hammer toes, Mallet Toe) • Prominent metatarsal heads with inadequate soft tissue padding • ภาวะโค่นนิ้วโป้งโป่งนูน Hallux valgus (bunions) • Bony Prominence • Partial foot Amputation การตัดขาบางส่วน • BKA,AKA • Charcot's joint (foot warm, swollen, red and painless during active phase) =callus or ulcer at mid foot มีภาวะเท้าอุ้งเท้าผิดปกติร่วมกับ อุณหภูมิเท้าผิดปกติ บวม แดงร้อน และมีอาการปวดร่วมด้วย 2. Pressure related • มีตุ่มน้ำBlister • มีหนังหนาแข็งที่ฝ่าเท้าCallus/Corn 3. Infection • ติดเชื้อราFungal infection. • Other เช่น dry skin					Figure 1 Hammer Toe Figure 2 Claw Toe Figure 3 Mallet Toe Figure 4 Bunion Figure 5 Charcot's foot

ระดับความเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

ข้อเสนอแนะ.....

แบบประเมินความพอดีและความเหมาะสมของรองเท้าผู้ป่วยเบาหวาน

(ปรับปรุงจาก Nancarrow, 1999 and Canada Guideline 2006,แนวทางเวชปฏิบัติสำหรับโรคเบาหวาน พศ 2551)

ให้พยาบาลตรวจความพอดีของรองเท้าทั้งสองข้างในขณะที่ผู้ป่วยยืนลงน้ำหนักเสมอ โดยพิจารณาตามรายละเอียดต่อไปนี้

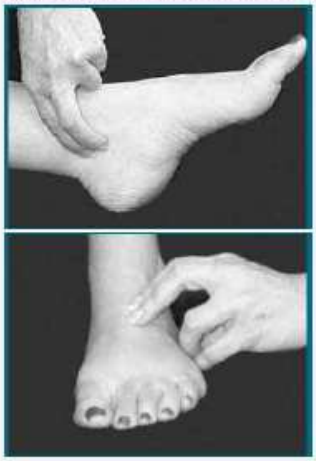
สิ่งที่ใช้ประเมิน	ใช่	ไม่ใช่
1.รองเท้าควรมีส้นรองเท้าสูง 1- 1 ½ นิ้ว โดยด้านหน้าส้นสูง 1 นิ้ว และด้านหลังส้นสูง 1 ½ นิ้ว		
2.รูปิดรองเท้าที่สวมใส่ มีสายรัดที่สามารถปรับได้ ไม่มีรอยตะเข็บบริเวณหลังเท้าหรือเป็นรองเท้าที่หุ้มทั้งเท้า หรือควรเป็นแบบผูกเชือก		
3.เมื่อยืนช่องว่างระหว่างหัวรองเท้าถึงปลายเล็บเท้าที่ยาวที่สุด ควรมีระยะห่างประมาณ 3/8 -1 นิ้วฟุต.		
4.พื้นรองเท้าที่รองรับหนานุ่มสามารถกดแล้วยุบตัวลงครึ่งหนึ่งของความหนาเดิม รับแรงกระแทกได้ดี		
5.รองเท้ามีส่วนที่หุ้มส้น ปิดคลุมเท้า หรือปิดคลุมด้านหน้า หรือมีสายรัดส้น เพื่อป้องกันการบาดเจ็บอันตรายที่เท้า		
6.วัสดุที่ทำรองเท้าควรเป็นหนังหรือผ้า ที่ระบายอากาศได้ดี ภายในบุด้วยวัสดุนุ่มป้องกันการเกิดเชื้อราได้		
7.รูปร่างรองเท้า มีขนาดพอดีกับเท้าทั้งขนาดและรูปร่างของเท้า ไม่คับหรือหลวมเกินไป		
8.ส่วนหลังของรองเท้าบริเวณเหนือส้นรองเท้า(heel counter)มีความแข็งแรง ส้นเท้ากระชับพอดี ไม่คับหรือหลวมเกินไป		
9.ขนาดรองเท้าสองข้างทั้งความยาวและความกว้างต้องเหมาะสมกับเท้าแต่ละข้างของผู้ป่วย		
10.ส่วนที่กว้างที่สุดของรองเท้าควรตรงกับตำแหน่งของปุ่มกระดูกด้านข้างของนิ้วหัวแม่เท้า หรือโคนของนิ้วเท้า (metatarsalsophalangeal ที่ 1)		
11.ส่วนหัวของรองเท้า เนื้อที่ภายในรองเท้าในส่วนของเท้าส่วนหน้า (fore foot) และตามแนวขวางของ Metatarso-phalangeal joints ควรมีความกว้างและลึกพอประมาณ สามารถขยับนิ้วเท้าได้พอสมควร		

การแปลผล ถ้าพบว่าการประเมินมี การตอบไม่ใช่ เพียง 1 ข้อจัดว่าเป็นการใส่รองเท้าที่ไม่เหมาะสม

ระดับความเห็นเกี่ยวกับการแปลผล ☐ เห็นด้วยไม่ต้องปรับปรุง ☐ เห็นด้วยแต่ต้องปรับปรุง ☐ ไม่เห็นด้วย

ข้อเสนอแนะ

ภาคผนวก 5: วิธีการการคลำของ Pedal Pulses *Location and Palpation of Pedal Pulses*



Dorsalis Pedis: ในการตรวจคลำชีพจรให้วางนิ้วมือที่ด้านข้างที่เส้นเอ็นกล้ามเนื้อยึดของนิ้วแม่เท้า ถ้าไม่สามารถจับชีพจรให้เลื่อนมือขึ้นทางด้านข้าง

Posterior Tibial: ในการตรวจคลำชีพจรให้วางนิ้วมือด้านข้างค่อนไปด้านหลังใต้ตาตุ่มด้านในของข้อเท้า ในรายที่ผู้ป่วยอ้วนหรือมีข้อเท้าบวม อาจคลำชีพจรได้ยาก

หมายเหตุ: เทคนิคการคลำ: จัดท่าให้ผู้ป่วยอยู่ในท่าที่สบายและสะดวกสำหรับผู้ตรวจ วางมือในตำแหน่งและขนานไปกับผิวหนัง พร้อมออกแรงกดในการคลำอาจช่วยให้คลำชีพจรได้มากขึ้น จะไม่สับสนชีพจรของผู้รับการตรวจกับชีพจรของผู้ตรวจ หรืออีกกรณีจำเป็นอาจใช้ชีพจร carotid pulse ของผู้ตรวจเปรียบเทียบก็ได้

การแปลผล Good คลำได้ชีพจร สองเส้น แต่มีอาการปวดขา

Fare คลำชีพจรได้ หนึ่งเส้น มีอาการร่วมกับการปวดขาจาก Ischemia

Poor คลำชีพจรไม่ได้เลย

ระดับความเห็นเกี่ยวกับการแปลผล ☐ เห็นด้วยไม่ต้องปรับปรุง ☐ เห็นด้วยแต่ต้องปรับปรุง ☐ ไม่เห็นด้วย

Comment

Suggestion

ภาคผนวก 6 การแบ่งกลุ่มประเภทความเสี่ยงในเท้าเบาหวาน The classification of four stage risk classification of the diabetic foot (**ประยุกต์มาจาก** : Perters and Lavery,2001; IWGD,2007)

การแบ่งระดับความเสี่ยง	Definition ความหมาย	History ประวัติการมีแผล	Sensation การรับความรู้สึก	Deformities ความผิดปกติของเท้า	Circulation ชีพจรและการไหลเวียนของเลือดส่วนปลาย	Self care knowledge ความรู้ในการดูแลตนเอง
Low risk (0)	Normal Sensory Neuropathy	-	Normal	-	Normal	-ตรวจเท้าทุกวัน รักษาความสะอาด ดูแลเท้า -ไม่เดินเท้าเปล่าในบ้าน -ใส่รองเท้าที่เหมาะสมได้ทุกแบบ -บริหารเท้า -ควบคุมระดับน้ำตาลในเลือด หยุดสูบบุหรี่
At increased risk(1)	Sensory Neuropathy	-	Loss 1 point	Abnormal Dermatology	Normal	-ตรวจเท้าทุกวัน เน้นดูแลเท้ารวมถึงผิวหนังและเล็บ -ไม่เดินเท้าเปล่าในบ้าน -บริหารเท้า -ควบคุมระดับน้ำตาลในเลือด หยุดสูบบุหรี่ -เลือกรองเท้าที่เหมาะสมใช้แผ่นรองเท้าด้านในที่มีความนุ่ม
At high risk(2)	Sensory Neuropathy plus foot deformity or peripheral vascular problem	+	Loss more than 1 point	+	Absent Pulse	-การดูแลเท้าและตรวจเท้าทุกวัน เช้า เย็น -ไม่เดินเท้าเปล่าในบ้าน -เลือกรองเท้าที่มีความกว้างและความลึกพิเศษ ใช้แผ่นรองเท้าด้านใน บริหารเท้า -ควบคุมระดับน้ำตาลในเลือด หยุดสูบบุหรี่
Very high risk/previous foot ulcer(3)	Previous ulcer of lower extremity	+	Loss more than 1 point	+ / Amputation	Absent Pulse	-การดูแลเท้าและตรวจเท้าทุกวัน เช้า เย็น -ไม่เดินเท้าเปล่าในบ้าน -เลือกใส่รองเท้าที่ตัดเฉพาะพิเศษ บริหารเท้า -ควบคุมระดับน้ำตาลในเลือด หยุดสูบบุหรี่ -การดูแลแผล และจัดการเมื่อเริ่มเป็นแผล

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

Comment

Suggestion

ภาคผนวก 7 การแบ่งประเภทของแผลที่เท้าเบาหวาน Grading Diabetic foot **ตามแนวของ** University of Texus

		Ulcer Grade (depth)			
		0	I	II	III
Ulcer Stage ระยะแผล	A	Pre / postulcerative lesion completely epithelialized แผลที่ขึ้นเยื่อบุผิว	Superficial lesion, not involving tendon, capsule or boneแผลอยู่ชั้นผิวนอก ไม่ลึกถึงกระดูก เอ็น และ ถุงหุ้มแคปซูล	Wound penetrating to tendon or capsule แผลลึกถึงเอ็นและถุงหุ้มแคปซูล	Wound penetrating to bone or joint แผลลึกถึงกระดูกและข้อ
	B	Infection	Infection	Infection	Infection
	C	Ischaemia	Ischaemia	Ischaemia	Ischaemia
	D	Infection and ischaemia	Infection and ischaemia	Infection and ischaemia	Infection and ischaemia

ระดับความคิดเห็น ☐ เห็นด้วยไม่ต้องปรับปรุง ☐เห็นด้วยแต่ต้องปรับปรุง ☐ไม่เห็นด้วย

ภาคผนวก 8 การดูแลเท้า

ท่านทราบหรือไม่ว่าโรคเบาหวานเพิ่มความเสี่ยงต่อการเกิดภาวะแทรกซ้อนของโรคเช่นแผลที่เท้า
ความจำเป็นของการตรวจประจำปี ต้องได้รับการตรวจเท้าโดยเจ้าหน้าที่อย่างน้อยปีละครั้ง เพื่อ**ค้นหาภาวะเสี่ยงต่อการเกิดแผลว่ามีภาวะเสี่ยงระดับใด** **ปัจจัยเสี่ยงของการเกิดแผลที่เท้า** ☐☐ ประวัติการมีแผลครั้งก่อน ☐☐ การสูญเสียการรับรู้ความรู้สึกของเท้า เช่น ชา ☐☐ความผิดปกติของเท้า การมีหนังแข็งหนาที่ฝ่าเท้า Callus and bunions เท้าผิดรูป claw toe Hammer Toes, Charcot's foot ☐☐ การไหลเวียนของเลือดที่เท้าไม่ดี หรือ ปวดน่องเวลาเดิน ปลายเท้าเย็น เล็บหนา ผิวบาง คลำชีพจรไม่พบ
การควบคุมระดับน้ำตาลในเลือดมีความสำคัญต่อสุขภาพเท้า พบกับทีมดูแลสุขภาพ และรับความรู้เกี่ยวกับการดูแลในโรคเบาหวาน

1.ตรวจเท้าทุกวัน

•ตรวจเท้าของท่านอย่างละเอียดทุกวันบริเวณขอกนิ้วเท้าว่ามีแผล รอยแดง ตุ่มน้ำ รอยแตก แผลเปิด ตาปลา หรือติดเชื้อราหรือไม่เปิด. หากท่านไม่สามารถทำเองได้ ควรขอให้มีญาติหรือคนอื่นตรวจสอบให้

•ส่องกระจกเพื่อดูด้านล่างของเท้า. ถ้าหากไม่เห็นหรือมีปัญหาสายตาของท่านขอความช่วยเหลือจากคนในครอบครัว

•ถ้าพบปัญหาที่เท้าไปพบแพทย์หรือผู้เชี่ยวชาญเท้าทันที

2.ป้องกันเท้าโดยการสวมรองเท้าอยู่เสมอ

•สวมรองเท้าขนาดพอดี ไม่คับหรือหลวมเกินไป เหมาะสมกับรูปเท้า ทำจากวัสดุที่นุ่ม

•แบบรองเท้าควรเป็นรองเท้าหุ้มส้นหรือรัดส้น ป้องกันอันตรายที่เท้า ไม่มีตะเข็บ หรือ มีตะเข็บน้อย มีเชือกผูก หรือมีสายรัดปรับได้ พื้นรองเท้านุ่ม ยืดหยุ่น

•หลีกเลี่ยงการสวมรองเท้าที่ทำด้วยยางหรือพลาสติก ไวนิล ป้องกันการเสียดสีเป็นแผล

•ไม่ควรสวมรองเท้าแตะแบบที่ใช้นิ้วเท้าคีบสายรองเท้า

•ไม่เดินเท้าเปล่าทั้งภายในและภายนอกบ้าน โดยเฉพาะพื้นผิวที่ร้อน เช่นหาดทราย พื้นซีเมนต์หรือสนามหญ้า

•สำรวจและตรวจภายในรองเท้าก่อนสวมใส่เสมอ เพื่อป้องกันสิ่งแปลกปลอมก่อให้เกิดแผลที่เท้า

•สวมถุงเท้าก่อนใส่รองเท้าเสมอ เลือกใช้ถุงเท้าที่ไม่มีตะเข็บ หรือกลับด้านในออก ควรเป็นถุงเท้าที่นุ่มซับเหงื่อได้ ไม่รัดแน่นจนเกินไป ควรเปลี่ยนถุงเท้าทุกวัน ถ้ามีอาการเท้าเย็นตอนกลางคืน ควรสวมใส่ถุงเท้า

3.รักษาความสะอาดของเท้า

•ล้างเท้าทุกวันและเวลาเท้าสกปรก ด้วยน้ำสะอาดและสบู่อ่อน ทำความสะอาดตามเล็บและซอกนิ้วเท้าและซับให้แห้ง

•ทาครีมหรือโลชั่นหลังจากล้างเท้า ห้ามทาครีมหรือโลชั่นที่ง่ามนิ้วเท้า

•ห้ามแช่เท้าในน้ำร้อนหรือใช้อุปกรณ์ให้ความร้อน เช่นกระเป๋าน้ำร้อน ขวดแก้วใส่น้ำร้อน วางที่เท้า

•หากจำเป็นต้องแช่เท้า ต้องใช้ด้วยน้ำธรรมดา ไม่เกิน 10 นาทีเพราะจะทำให้ผิวแห้งแตกมากขึ้น ไม่ควรใช้น้ำอ่อน จะชะไขมันที่ผิวหนังออกไป

4.ไม่ทำให้เกิดแผลจากการตัดเล็บ

•ตัดเล็บตามแนวตรง และตัดตามแนวขอบเล็บให้ปลายเล็บเสมอกับปลายนิ้ว และตะไบส่วนขอบเล็บ ห้ามตัดสั้นจนเกินไป ให้เหลือ 1-2 mm และห้ามลึกถึงจุกเล็บ ห้ามตัดเนื้อเพราะอาจเกิดแผลและมีเลือดออก

•ห้ามตัดตาปลาหรือเนื้อแข็งด้วยตนเอง รวมทั้งห้ามใช้สารเคมีใดๆลอกตาปลาด้วยตนเอง•

ภาคผนวก 9 แนวทางการเลือกรองเท้าสำหรับผู้ที่มีภาวะปลายประสาทเสื่อม

Characteristic	Appropriate foot wear	Reasoning
Normal foot รายที่เท้าปกติ	Can use every style สวมใส่รองเท้าได้ทุกแบบ ทุกสไตล์	
Neuropathic foot	-Shoe not too tight or too loose รองเท้าที่ขนาดเหมาะสมไม่หลวมหรือคับเกินไป - Simple sandal with back strap or Sport shoe รองเท้าแตะที่มีสายรัดส้นด้านหลังหรือรองเท้ากีฬา	Moulded insole reduce heel mean peak pressure,forefoot pressure(Windle wt al,1999)
Neuropathic foot plus deformity -Claw toe -Hammer toes -Bunion	-Simple sandal has back strap with orthotic-arch support รองเท้าแตะที่มีสายคาดปรับได้ หรือมีการอุปกรณ์เสริมตามความเหมาะสม เช่นmetatarsal pad ,pronator/ supinator wedge	Custom mould shoe reduce the forefoot peak plantar pressure and restructure the force through plantar surface.(Beuker et al,2005)
Neuropathic foot plus deformity and history of ulcer/ marked scarring	-รองเท้าแตะที่หล่อจากเท้าผู้ป่วยเอง(Insole or moulded sandal) -รองเท้ากีฬาที่ใช้แผ่นรองในที่หล่อเฉพาะเท้า (Sport shoe with moulded insole -รองเท้าที่ดัดขึ้นหล่อโดยเฉพาะและมีแผ่นรองเท้าด้านใน- (Adjustable custom moulded shoe with moulded insole)	
Charcot foot or unstable ankle	-รองเท้าที่หล่อจากเท้าผู้ป่วยเอง ที่ใช้แผ่นรองในรองเท้าดัดรองเท้าเฉพาะร่วมกับการอุปกรณ์เสริมตามความเหมาะสมแต่ละราย (Custom mould shoe/boot with moulded insole and rigid rocker undersole)	Custom mould shoe reduce the forefoot peak plantar pressure and restructure the force through plantar surface.(Beuker et al,2005)

Note: Top sandals or beach sandal are not recommended for patients with neuropathic foot

(From Apelqvist et al, 2008;Bus,S et al,2008; Deursen et al,2008; Dahmen &Haspels,2004; IWDF, 2007)

Appendix 7 Analysis interview data in patients, nurses and educators

Appendix 7.1 Coding for interview

Nursing practice guideline for foot care for diabetic patients in Thailand

Interview patients

Question	code	Sub-question
1. How long have you had diabetes?	Duration of DM	
2. Do you understand what diabetes is?	Meaning of DM	Cause of DM/ known
3. Did you understand the problem? And do you know your complication?	- Knowledge of complication	Knowledge/Prevention complication
4. Have you developed any complications? For example neuropathy	Perception of complication	
5. Have you noticed any changes to your feet as a consequence of you diabetes?	Changing of DM foot	
6. Do you have any problem with your feet?	Sign and symptom of Neuropathy	
7. What information did the nurse/doctor give you about your diabetes? For example foot care, Blood screening,	Foot care Education Dietary Understanding dietary education exercise	
8. How do you care for your body and your feet?	Foot self-care glycaemia control/poor	
9. Who else at home understands about your illness? Do they help?	Caregiver/helping	

Interview nurse and educator

Question	Code	Sub-code
1. How often do you see patients who are diabetic and also have foot problem?	Experience	
2. What kind of foot problems do patients present with? (Foot ulcer, neuropathy, numbness, no sensation, Charcot)	Classify risk	
3. For patients who have foot ulcers and neuropathy what do you do?	-Wound management and -Neuropathy management in high risk of foot care	-Dressing/Debridement -Foot care education -Foot wear, Off loading -Skin and nail care
4. For patients who have foot ulcers and no neuropathy what do you do?	-Wound management in low current risk	-Dressing/Debridement -Foot care education -Off loading
5. For patients who have neuropathy and no foot ulcers what do you do?	-Neuropathy management of increased risk	-Vascular assessment consideration -Foot wear evaluation -Foot care education -Patient feet inspection
6. Are you concerned when you see a patient with neuropathy and foot ulcer?	-Assessment of risk	
7. How do you screen for diabetic neuropathy?	-Neuropathy Assessment	
8. How often do you screen the diabetic patient with and without neuropathy?	-Experience of neurological Assessment	
9. Do you use a structured screening approach to manage the patients?	Structure Screening	
10. What form does this structured approach take?	Assessment the feet Diabetes history Medical history Surgical history Social factor Feet examination Classify Risk	Deformity Problem of foot wear Vascular problem Neurological problem Presence of ulcers or infection
11. What advice do you give them?	Patients Education Advice	
12. What do you teach about daily foot care?	Daily feet self-care	Daily examination Walking indoor and outdoor with foot
13. Do you think patients can manage foot examination daily?	Patient self-management	
14. What current foot care guidelines do you use?	Assessment Referral system Inspection Reduce risk of ulcer	

Question	Code	Sub-code
15. Does the current guideline work? Why?	Evaluate current guideline	

Scenarios 1	Concept
A Thai old woman of 64 years has had Type 2 diabetes for 20 years. She has not managed her diet and blood glucose control for the last 10 years. As she became aware of numbness of her feet, she started to control diet. She ate only half cup of rice per meal and avoided the sugar in her food. Sometimes she bought instant food although she knew it was not good and instant food have monosodium glutamate. She attends the diabetes clinic for annual review and has no other foot problems. On the routine visit to the clinic, she complains of numbness in both feet.	Care diabetic patients with poor glycaemia

Scenarios 2	Concept
A Thai adult man of 50 years has had Type 2 diabetes for 15 years. He has not managed his diet and blood sugar control since diagnosis. He attends the diabetic clinic for annual review. On close inspection of his foot, there is callus and a small ulcer under the second metatarsal head. His foot hygiene is poor. Actually, he never walks barefoot but mostly he wears a pairs of slipper that is not waterproof. He also ventures outside so that his feet get wet.	Care of diabetic patient with foot problem

Question	Code	Sub-code
1. How would you manage this case?	-Management of diabetes foot care	-Blood sugar -Risk factor detection -Food Advice -Self-care and self-monitoring
2. What advice would you give her?	-Patients Education	-Foot wear -Foot care daily -Foot inspection

Appendix 7.2 Patient's interview data analysis

An example of segmenting and coding data in patients

Theme of patients	Sub-theme	Code
	Duration of DM	Time onset and chef complaint (9)
Knowledge of DM	Cause of DM	-Sweet taste food-Belief (3) -Genetic cause belief (4) -Pancreas cause (3) -Smoking and drinking (1)
Understanding	Cause of DM	known cause of diabetes (8) -Don't know cause (7) -Don't Understanding of DM (9)
	Meaning of DM	-Understanding what is diabetes (6) -Still living with illness(3)- incurable disease
Knowledge of DM complication	Knowledge of complication	3 Knowledge of complication (14) - Know Cholesterol (2) - Renal (9) - Retinopathy (5) - Heart(4) - Hypertension (3) - Brain (2)
	Knowledge of prevention	-Can prevention (7) -Knowledge of Preventing complication (7) -Don't know how to prevent (6)
	Presence own complication	-Observe abnormal sign from treatment (1) -Foot ulcer (1) -Hypertension (12) -Cholesterol (8) -Gout (2) -Renal (2) -Thyroids (1) -Urinary retention (1) -Retinopathy (4)
Knowledge of diabetic foot completion	Changing of DM foot	-Changing of DM foot (15) -Neuropathy with unknown cause (3) -Never observe (1) -Changing of DM foot---Not relevant (1) -Motor nerve damage (1)
	Sign and symptom of neuropathy	6 Problem of Neuropathy (14) 6. No problem of neuropathy(1) 6.1 loss sensation (4) 6.2 numbness (11) 6.3 itching and tingling (10) 6.4 pain at night (3) 6.5 burning (3) 6.6 fungus (1) 6.7 history of foot ulcer (5) 6.8 callus (3) 6.9 deformity (5) 6.10 pain all day all night (3)

		6.11 skin cracking and skin changing (8)
Theme of patients	**Sub-theme**	**Code**
Education	Patient education From Nurse	7.1foot washing and exam (14) 7.2 Dietary Understanding (15) 7.3 blood serum exam (12) 7.3 Medicine (7) 7.4 Medicine(15) 7.5 exercise(5) 7.foot care Education (14)
Practice self-foot Care	Foot self-care	8.0 Never know how to care foot (1) 8.1 foot wash (14)
	Daily foot care	8.1.2 Don't do foot exam (4) 8.1.2never apply cream (4) 8.1.3 warm foot bathing (1) 8.7 Nail care (2) 8.8 foot exercise (1)
	Appropriate footwear	8.2appropriate footwear (4)
	Inappropriate footwear	8.2.1 wear sandal (6) 8.2.1.1sandal tough outside (2) 8.2.2 wear slipper inside (1) 8.2.3 bare foot (1)
	Body care	8.3 control food (7) 8.4 exercise (7) 8.6.1glycemia control/poor (12) 8.6Problem of diet control (14) 8.7 Medicine Knowledge/problem (5)
Social support	Caregiver/helping	9.caregiver/helping (14) 9.3 take care yourself (9) 9.1 Cooking and come together (4) 9.2 Psycho support (4) 9.3 buy ready meal (1)

Appendix 7.3 Nurse Interview data analysis

An example of segmenting and coding data in nurses

Textual Data	Data segmentation	Code
Q: How often do you screen the diabetic patients with and without neuropathy One nurse stated that '*I screened only Monofilament and structured approach and did not assess neuropathy. Doctor would be classified neuropathy.'(sic)* Q: What current foot care guideline do you use? '*Sometimes, I did not know how to evaluate a strong pulse or regular pulse. I may do palpation in the wrong position and was not able to do palpation. I cannot classify between strongly and lightly palpation.' (sic)*	Do Monofilament and history of Foot ulcer, skin assessment Never diagnosis neuropathy Don't know how to evaluate pulse Assess the wrong position of palpation	Structure assessment Neuropathy assessment experience Palpation assessment Problem Accuracy of palpation

Nurse theme	Sub theme	code
Practice	Experience	1.1 foot problem everyday (1) 1.2 often (4) 1.3 do foot massage (1)
Practice	Categories of foot Problem	2 wear sandal (1) 2.1.2 foot no back rub (1) 2.1.3 Have and Don't wear diabetic foot(2) 2.1.3 wear footwear only see the doctor, wear sandal when stay home (1) 2.4 .1callus (5) 2.4.2 Bunion (4) 2.4.3 Charcot (1) 2.4.5 flat foot (1) 2.4.6 Hammer toe (1) 2.4.7 Claw toe (2) 2.4.8 Hallus (1) 2.5 crack skin (1) 2.5.2 dry skin (2)

		2.6 numbness (5) 2.7 foot ulcer (4) 2.8 colour change (1) 2.8 fungus (2) 2.9 nail (1) 2.9 vascular (1)
Knowledge Practice	Management of Foot ulcer and Neuropathy	3 never see patients is foot ulcer with) neuropathy (1) 3.10 refer to dressing (5) 3.11 wound assessment (2) 3.1foot exam when they come to hospital (3) 3.2 trim callus (1) 3.3 advice foot care and foot scrub (1) 3.4 foot ulcer care (1) 3.5 refer to physiologist to manage footwear (2)
	Foot deformity Management	3.6 footwear appropriate (1) 3.7 off loading (1) 3.8 foot exercise (1) 3.9 foot care hygiene (1)
Knowledge Practice	Management of foot ulcer No neuropathy	4 refer to surgery(1) 4.1 refer to Dressing ER (4) 4.1.2 Refer to another Hospital (1) 4.10 refer to vascular surgery (1) 4.11 dropper test (1) 4.2 foot exam (2) 4.3 Advice non weight (2) 4.3.1 Advice foot exam (1) 4.3.2 Advice appropriate foot wear (1) 4.3.3 Advice foot ulcer checking (2) 4.5 make appointment after foot healing (1) 4.6 wound assessment (1) 4.8 ABPI testing (1) 4.9 vascular assessment (1)

Nurse theme	Sub theme	code
Knowledge Practice	Management of neuropathy No foot ulcer	5.1 advice foot exam (4) 5.2 advice foot ulcer checking (5) 5.3 advice appropriate footwear (4) 5.3.1 advice the characteristic of footwear (1) 5.4 advice foot exercise (1) 5.4.1 apply lotion (1) 5.5 wear sock (1)
Knowledge of neuropathy with ulcer	Concern in Neuropathy with ulcer	6 concern with deformity (1) 6.1 concern with foot ulcer (3) 6.1.1 concern with foot ulcer and neuropathy (1) 6.2 don't do anything with loss sensation (1) 6.3 refer to dressing (foot ulcer case) (1) 6.4 follow up loss sensation case (1) 6.5 Monofilament (1) 6.6 refer (1)
Knowledge	Screening Neuropathy	7.1 monofilament (5) 7.2 pain history (3) 7.3 numbness assessment (1)

		7.4 vascular assessment (2) 7.5 consult doctor to diagnosis (1)
Practice	Structure screening	9.1 monofilament test (5) 9.2 palpation (5) 9.3 follow up annually (1) 9.3 never test ABPI (3) 9.4 use to classify patient and follow up annually (1) 9.4 use to collect data and don't classify the neuropathy (2) 9.5 foot awareness (1) 9.6 check skin nail (1)
	Foot assessment Form	10.1skin assessment (3) 10.2 nail assessment (3) 10.3 foot shape /foot deformity(4) 10.4 pulse palpation (5) 10.5 monofilament (5) 10.6 numbness (4) 10.7 burning (4) 10.8 pain history (4) 10.9 don't check temperature of foot or foot hair (1) 10.10 footwear (1) 10.11 foot ulcer assessment (4) 10.12 joint movement and eyesight (1) 10.13 no record crack skin
Education	Patient education	11 convince the importance of foot (1) 11.1 advice same topic all patient (3) 11.1 footwear changing (4) 11.2 appropriate wear footwear don't bare foot (4) 11.3 nail cutting (2) 11.3 trim callus by scrub with scot bright (1) 11.4 foot ulcer care (1)

Nurse theme	Sub theme	code
Education	Daily foot care	12.1 group teaching (1) 12.10 trim callus (2) 12.11 control sugar (1) 12.2 foot washing (5) 12.3 footwear appropriate (5) 12.4daily foot exam (4) 12.5 nail cutting (4) 12.6 apply cream (2) 12.7 non barefoot (2) 12.8 foot exercise (3) 12.9 exam footwear (2)
Education	Foot management of patients	13. believed Patient self-care (2) 13.1 can't change behaviour (4) 13.2 financial problem (2) 13.3 still wear same shoe (2) 13.4 foot exercise -never ask whether patients can do (1)
Practice	Guideline	14 advice foot care (1) 14.1 foot exam annually (5)
	Foot assessment	14.10 foot ulcer assessment (2)

		14.5.1vascular assessment do palpation (7) 14.5.2 vascular assessment: dropper (1) 14.5.3 check ABI (1) 14.9 assess skin and joint movement (3) 14.4 interview history of ulcer and foot ulcer (4) 14.4.1 foot exam every visiting doctor (1)
	Classify	14.8 don't classify risk group (1) 14.2 classify risk group (1) 14.3 don't follow up by risk group (2)
	Refer	14.5.4 refer to vascular surgery (1) 14.11 refer to dressing and follow up (2) 14.12 refer to doctor (1) 14.13 refer to physiotherapist (1)
Education	outcome of Guideline	15 no foot care guideline (3) 15 vascular assessment (1) 15.1 patient got foot exam anally (2) 15.10 accuracy for palpation (1) 15.11 patient feel waste time to do foot exam (1) 15.12 wear non appropriate footwear (1) 15.13 don't use dropper (1) 15.2 not refer in neuropathy (2) 15.3 doctor diagnosis neuropathy (2) 15.4 not refer in vascular problem (4) 15.5 don't classify risk group (1) 15.6 don't check ABPI (3) 15.7 footwear (1) 15.8 don't follow up all DFU (1) 15.9 accuracy of Monofilament testing (1)

Appendix 7.4 Educator interview data analysis

Educator theme	Sub theme	Code
Practice	Experience	1.1 often (4)
		1.2 sometimes (1)
Practice	Categories of foot Problem	2.10 dirty foot from no footwear (1)
		2.11 poor eyesight (1)
		2.1 foot ulcer (5)
		2.2 numbness (4)
		2.3 loss sensation (4)
		2.4 callus (2)
		2.5 infected wound (4)
		2.6 flat foot (1)
		2.7 bunion (1)
		2.8 Charcot foot (1)
		2.9 claw toe (1)
Knowledge Practice	Management of foot ulcer and neuropathy	3. nail cutting (1)
		3.1 dressing (4)
		3.2 advice foot exam daily (4)
		3.3 advice footwear inside outside home (4)
		3.4 don't foot warm soaking with hot water (4)
		3.5 keep feet clean (3)
		3.6 foot protection from shape thing (2)
		3.7 foot massage (1)
Knowledge Practice	Management of foot ulcer no neuropathy	4.1 daily foot exam (3)
		4.2 foot exercise (2)
		4.3 appropriate footwear (3)
		4.4 don't sit cross- legs (1)
		4.4 foot hygiene (2)
		4.5 pain release
		4.6 wound care (1)
		4.7 wound dressing (1)
		4.8.don't foot bathing (2)
Knowledge Practice	Management of Neuropathy no foot ulcer	5.1 foot massage (3)
		5.2 don't know clearly (1)
		5.3 control glycaemia (1)
		5.4 appropriate footwear (1)
		5.4 foot care (2)
		5.6 do warm foot compress (1)
		5.7 foot exercise (1)
		5.7 don't hot/cold foot soaking (2)
		5.8 foot exam and food hygiene (1)
		5.8 protect not to be wound (1)
		5.9 footwear all outside home (1)
Knowledge of neuropathy with ulcer	Concern in neuropathy with ulcer	6 concern (5)
		6.1cause infection (3)
		6.2 cause septic shock (1)
		6.3 cause amputation (4)
Knowledge	Neuropathy assessment	7.1 monofilament (1)
		7.2 ask numbness (1)
		7.3 palpation (1)
		7.3 two point discrimination (2)

		7.4 joint movement (1) 7.4 recognition of textures-by cotton (1)
Practice of foot assessment	Structure screening	9.1 don't categorise group or severity (5) 9.2 assess numbness in foot ulcer (1) 9.3 never do monofilament (1) 9.4 no assessment form (1)
Practice	Foot assessment form	10 no assessment form (4) 10.1 numbness history (1) 10.2 sensation testing by palpation (1) 10.3 wound assessment (1) 10.4 joint movement (1)
Education	Patient education	11.1 foot exam (1) 11.2 wound care (1) 11.3 appropriate footwear (1) 11.4 footwear outside (1) 11.5 wear sock (1) 11.6 advice following the problem (1) 11.6 don't do foot warm compress/bathing (1) 11.7 never concern footwear inside house (1)
Education	Daily foot care	12.1 appropriate footwear (3) 12.2 self-foot exam (4) 12.3 footwear inside outside house (3) 12.4 foot exercise (2) 12.5 avoid to foot hot bathing (1) 12.5 nail cutting (1) 12.6 food control/ glycaemia control (2) 12.7 exercise (1) 12.8 foot massage (1)
Education	Self-management of Patients	13. Patient take care yourself (3) 13.1 Can't do (1) 13.1 depend on health care provider (1) 13.3 limited in case of elderly case (1) 13.3 see doctor as severe ulcer (1) 13.3 in case of interested patients (1) 13.4 limited in case of no caregiver (1) 13.5 limited in case of financial problem (1) 13.6 sandal footwear (1)
Practice	Guideline	14 No guideline (4) 14.1 advice foot care, washing (3) 14.2 wound assessment (2) 14.3 foot exam (2) 14.4 foot massage (1) 14.4 footwear outside house (1) 14.5 diabetic treatment- take medicine, food control especially instant food (1) 14.5 foot exercise (1)
Education	outcome of guideline	15.1 effective in case of good controlling glycaemia (1) 15.2 effective sometimes (2) 15.4 non effective- still amputation (1)

Appendix 8 Analysis of consensus of nursing practice guideline questionnaire agreement

Statement of questionnaires	% Consensus Agreement	
	Round1	Round2
Patient Empowerment and education 1.1Effective care and decision making should be shared between patients and health care professional	90	100
1.1 All patients or caregivers should get an Education: understanding of their condition and the resources available ulcer optimize their general health, diabetes management and ulcer care	90	100
1.2 As part of ongoing foot care, professionals should arrange recall and perform on an annual review to detect risk factors for ulceration	80	100
1.3 People who are older and have had diabetes for a long time, poor vision, poor footwear, smoke, live alone should be given vigilantly care.	85	94
Continuing professional development 2.1 Nurse and health care professionals involved in the assessment of diabetes feet should obtain adequate training.	90	94
Foot Examination and Monitoring 3.1 Foot examination should contain -foot sensation testing with a 10g monofilament or vibration -foot pulse palpation -any foot deformity inspection -footwear inspection	90	100
3.2 Monofilaments should not be used to test more than ten patients in one session and should be left for at least 24 hours to recover (bucking strength) between session	80	88
Holistic Assessment 3.3 Nurses should accomplish a foot risk assessment for diabetes people. This risk assessment includes the following: -History of previous foot ulcers -Sensation by testing with 10 mg monofilament or vibration -Structural and biomechanical abnormalities -Circulation by testing foot pulse palpation -Self-care behaviour and knowledge (Refer to Appendix B,C,D,E)	90	100
3.4 People with diabetes should be encouraged with self-monitoring and inspection of foot.	85	100
Classify of risk factor 4.0 Based on assessment of risk factors, patients should be classified as: -lower current risk (normal sensation, palpable pluses) -at increased risk (neuropathy or absent pulses or other risk factor) -at high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcers) -ulcer foot	90	100

Statement of questionnaires	% Consensus Agreement	
	Round 1	Round2
Care of people at lower current risk 5.0 Nurse should discuss and agree with patients a management plan which consists of an appropriate foot care education programme so as to improve knowledge, encourage beneficial self-care and minimise inadvertent self-harm.	90	100
5.1 Patients who is at lower current risk should be reviewed annually	90	100
Care of people at increased risk 6.0 Patients who is at increased risk should be referred to a foot protective team	90	100
6.1 Patients who is at increased risk should be arranged to review 3-6 monthly by a foot protective team at review: -patient's feet inspection -review need for vascular assessment -footwear evaluation	85	94
6.2 Patients who are at risk if developing foot such ulcers such as those with neuropathy should have enhanced foot care education and encourage self-foot care.	75	100
Care of people at high risk of foot ulcer 7.0 Patients who is at high risk of foot ulcer should be referred to a foot protective team	90	100
7.1 Patients with high risk of foot ulcer should have frequent reviewed 1-3 monthly by a foot protective team at review: -patient's feet inspection -review need for vascular assessment And evaluate and provide appropriate: -intensified foot care education -specialist footwear and insoles -skin and nail care	90	94
Care of people with foot ulcers 8.0 A patient with a new foot ulcer should be urgently assessed by an appropriately trained health professional	85	100
8.1 All patients with diabetic foot ulcers should be assessed for signs and symptoms of infection and facilitate appropriate diagnosis testing and treatment.	90	100
8.2 Record and assess a health history, allergies, medications, functional assessment and physical examination : neuropathy, vascular status, callus, infection, foot deformity/pressure ulcer including diabetes management	85	100
Vascular Assessment 8.3Assess vascular status at bilateral lower extremities for vascular supply and facilitate appropriate diagnosis testing	90	100

Statement of questionnaires	Consensus Agreement	
	Round 1	Round2
8.4 Assess signs and symptoms of infection and facilitate appropriate diagnosis testing and treatment	90	100
8.5Assess for autonomic, sensory and motor(S.A.M) changes in order to identify peripheral	90	100
8.6 Assess for deformities, foot pressure, gait, footwear and devices and facilitate appropriate referral	90	100
8.7 Describe and identify the characteristics of the ulcer, identify the location, length, width, depth, assess ulcer bed, exudate, odour and peril-ulcer skin, and classify the ulcer. (Appendix G)	90	100
8.8 Assess and optimise systemic, local and extrinsic factors that can influence wound healing.	90	100
8.9 Provide wound care, debridement, infection control, a moist wound environment and pressure redistubution	85	100
8.10 Individuals assessed as being at high risk for foot ulcer/amputation should be advised of their risk status and referred to their primary care provider for additional assessment or to specialized diabetes or foot care treatment and education teams as appropriate.	85	94
Patient Empowerment and Education 9.0 All persons with a diagnosis of diabetes or caregivers should receive foot care education on an ongoing basis.	85	Cutt off
9.1 Foot care education should be provided to all diabetic patients and reinforced at least annually.	90	Cut off
9.2 Nurses in all practice settings should give and reinforce basic foot care education appropriately. (adjusted to 1.4 in questionnaire round 2)	90	94
9.3 Patient education approaches should be use differently until optimal methods appear to be identified in terms of desired outcomes(adjusted to 1.5 in questionnaire round 2)	90	100
9.4 At the time of first diagnosis structured patient education should be made available to all people with diabetes and then as required on an ongoing basis, based on a formal, regular assessment. (Appendix H) (adjusted to 1.6 in questionnaire round 2)	90	100
9.5 The basic foot care education for people with diabetes should consist of the following element: -Awareness of personal risk factors -Importance of at least annual inspection of feet by a health care professional -Daily self-inspection of feet -Proper nail and skin care -Injury prevention -When to seek help and specialized referral (adjusted to 1.7 in questionnaire round 2)	90	100
9.6 Education should be modified to patient's current knowledge, individual needs, and risk factors. Principles of adult learning must be used. (adjusted to 1.8 in questionnaire round 2)	90	100

Statement of questionnaires	Consensus Agreement	
	Round 1	Round2
Education of Nurse 10.0 Nurse should have the knowledge and skills in the following areas so as to competently assess a patient's risk for foot ulcers and provide the required education and referral: -Skills in conducting an assessment of the five risk factors -Knowledge and skill in educating patients -Knowledge of sources of local referral (adjusted to 2.2 in questionnaire round 2)	90	100
10.1 Health/Nursing Educational institutions should integrate Nursing Practice Guideline *Reducing Foot Complications for People with Diabetes* into basic nursing education curriculum and provide continuing education programs in this topic area. (adjusted to 2.3 in questionnaire round 2)	90	100
Appendix A: Risk Assessment Algorithm	80	100
Appendix B: Use of the Semmes-Weinstein Monofilament	85	100
Appendix C: Diabetes Foot Assessment/Risk Screening Guide	80	100
Appendix D(Structural and Biomechanical Abnormalities)	85	100
Guideline for appropriate footwear evaluation	85	94
Appendix E: Location and Palpation of Pedal Pulses	85	94
Appendix F:The classification of four stage risk classification of the diabetic foot	85	100
Appendix G: Grading a diabetic foot ulcer	85	100
Appendix H: Care Tips for the feet	85	100
Appendix I: Appropriate foot wear	85	100

Appendix 9 Poster Seminar Presentations

Theoretical Model for developing a foot care guideline

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Aim

To establish a foot care guideline for diabetic patients in Thailand

Method

Systemic review was conducted to evaluate evidence of diabetic foot care and diabetic foot management. The author chose an evidence-base practice model as a conceptual framework (Soukup, 2000) to develop foot care guideline: Assessment and Management foot complication. The Four phases of Evidence – base practice model: evidence-trigger phase, evidence –supported phase, evidence-observed phase and evidence –based phase were conducted to make nursing practice recommendation questionnaires and statements.

Fig 1 Soukup Model

Results

Evidence –trigger phase refers to knowledge trigger of foot care management and focuses on foot care problem in Thailand. 5 educators, 5 Nurses, 19 Patients were interviewed to find the problem and need of foot care in Thailand. In phase 2 ten practical recommendations for foot care guideline were extracted from clinical statement from a total of 871 literatures by PubMed, Medline search (approximately 1965-2008). In the evidence –support phase using the modified Delphi Technique : 20 experts commented on the first draft of the questionnaires . Phase 4 will be in the process of being piloted.

Conclusion

The Soukup model provides a framework for practitioner to solve a problem faced in clinical practice in a systematic way using a range of methods such as the Delphi Technique. Therefore, guideline produced using Soukup theoretical model is underpinned by theory, consensus, and evidence based research.

Reference

Soukup,S.M. (2000) The Center for Advancd Nursing Practice evidence-based practice model: promotion the scholarship of Practice. Nursing Clinical North American.35,301-9.

Prevalence and Incidence of diabetic foot ulcer Thailand (Chantaburi Province)

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Introduction

A diabetic foot ulcer is one of the most important complications of long term diabetes. Diabetic foot ulcers can severely affect the quality of life and increase the morbidity, mortality and the cost of health care services. 285 million people worldwide had diabetic in 2010(IDF, 2010).15-20 percent of diabetic patients will have foot ulceration during their life (Singh, 2005) and every 30 second a diabetic patient loses his/her legs (IWGDF, 2008).

Aim

This study aims to explore the incidence and prevalence of diabetic foot ulcers among diabetic patients in a tertiary Hospital in Chantaburi Province: Thailand.

Method

A cross sectional study in the diabetic foot clinic in tertiary hospital at Prapokklao Hospital, Chantaburi Province, Thailand was carried out from 2006 to 2008. Patients eligible for the present study were diabetic patients in Out Patient Department. A sample size of 3437 diabetic patients were analysed. A diabetic foot ulcer was diagnosed if ulceration involved full-thickness penetration of the dermis of the foot in a person with diabetes. Ulcer severity was classified using the Wagner system: Grade 1 ulcers were superficial ulcers involving the full skin thickness but no underlying tissues. Grade 2 ulcers were deeper, penetrating down to ligaments and muscle, but not involving bone or abscess formation. Grade 3 ulcers were deep ulcers with cellulitis or abscess formation, often complicated with osteomyelitis. Grade 4 Ulcers have localised gangrene, and Grade 5 ulcers have extensive gangrene involving the entire foot. All patients attending the OPD had their feet examined and foot care advice given by the nurses.

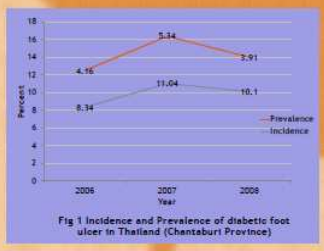

Fig 1 Incidence and Prevalence of diabetic foot ulcer in Thailand (Chantaburi Province)

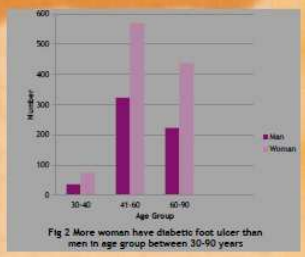

Fig 2 More woman have diabetic foot ulcer than men in age group between 30-90 years

Result

The findings as shown in Figure 1 indicate that the prevalence of diabetic foot ulcers in Prapokkloa Hospital in 2006 – 2008 was 4.16%, 5.34 % and 3.91% respectively. Incidence of diabetic foot ulcers in diabetic patients in 2006 -2008 was 8.34%, 11.04% and 10.10% respectively. The mean of age in diabetic patients who have diabetic foot problems was 65 years and as shown in Figure 2 more women than men had diabetic foot problem

Discussion

This high incidence and prevalence of diabetic foot ulcers have implications for patients and the development of services. Increasing number of diabetic patients will require the more services in hospital, and more staffs in order to provide effective prevention and management of diabetic foot care. Increasing trend of prevalence indicates that the implication for diabetic patients is increasing and a better system for preventing foot ulcers or foot disorder is required.

Conclusion

15 percent of diabetic patients will develop diabetic foot ulcer with the predicted number of diabetic likely to rise (WHO). The prevalence and incidence of diabetic foot ulcers in Thailand (Chantaburi province) remains higher than developed countries. Therefore, there is a greater need to develop intensive patient education, improved service to prevent foot ulcers/foot loss and to enhance quality of life.

Exploring Foot Care Education in Diabetic Patients in Thailand

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Introduction

It is estimated that 285 million people worldwide (IDF, 2011) have diabetes and every year approximately 1 million will lose their leg due to the disease. The majority of these amputations is preceded by an ulcer due to peripheral neuropathy, foot deformities, minor trauma and peripheral vascular disease (IWGDFU, 2007). The range of foot lesions vary depending on the socio-economic status of the patients, the standards of foot care and the quality of foot wear.

The ulcer and amputation in Figure 1 was caused by scratching due to itchiness which eventually resulted in an ulcer and amputation. In Figure 2, the patient had neuropathy and had a burn from stepping on burning incense. Self care of the burn progressively got worse resulting in necrosis and amputation.

Figure 1

Figure 2

Aim

The aim of this study was to explore what education diabetic patients received in the management of their feet and what advice and education practitioners provided.

Methodology

Data was collected from 15 patients, 5 educators and 5 nurses using semi-structured interviews in a District Hospital in the Province of Chantanburi in Thailand. The raw data were analysed using content and thematic analysis. Initially thirteen categories emerged which were further reduced to two major themes: knowledge and understanding of the disease and education.

Findings and Discussion

The findings indicate that only 36% of patients receiving hospital treatment for diabetes understood their conditions. Patients also mentioned that diabetes was an incurable disease commenting *'this illness will always be with me'*; with those attending the hospital clinic having developed complications, as shown in Chart 1.

93% of patients (*n*=14) indicated that they had received foot care education from doctors and nurses which included conducting daily foot examinations, application of creams and selecting appropriate foot wear. However, patients' reports suggest that patients did not take sufficient preventive action in order to avoid foot complications as shown in Chart 2. Inappropriate foot care and foot wear could be contributory factors in the development of foot complications. Results also showed both nurses and educators showed poor knowledge in the management of foot care in diabetic patients.

Chart 1: Diabetic Complications

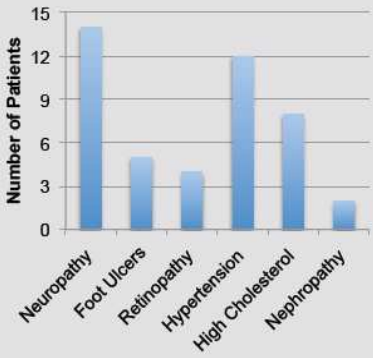
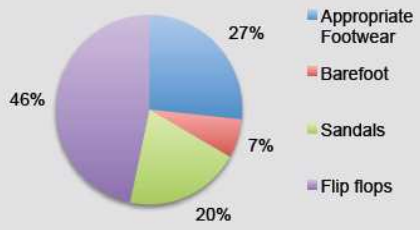


Chart 2: Footwear Choices



Conclusion

Although foot care education is given to diabetic patients, it is sporadic. A more systematic and organised system of foot care education should be developed supported by a robust audit system for monitoring quality. The findings from this study influenced the development of a foot care guidelines for use using the Delphi Technique and being piloted in Thailand

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